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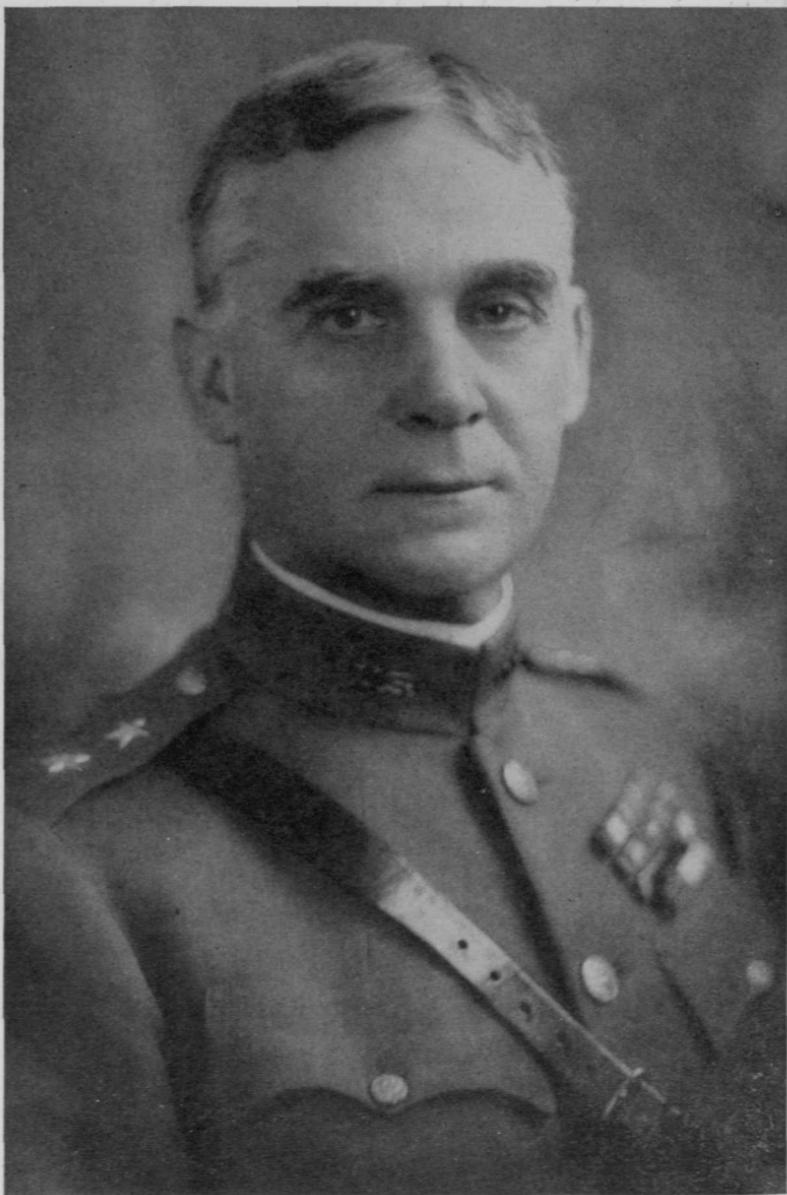
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MAJOR GENERAL CHARLES PELOT SUMMERALL
Chief of Staff

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Appointment of Chief of Staff

THE Secretary of War announces the selection of Major General Charles Pelot Summerall as Chief of Staff, succeeding Major General John L. Hines.

Major General Charles P. Summerall was born near Lake City, Fla., March 4, 1867. In 1888 he entered the U. S. Military Academy. Upon graduation in 1892, he joined the First Infantry and was assigned to Benicia Barracks, California. In 1893 he transferred to the Fifth Artillery at the Presidio of San Francisco. In 1896 General Summerall went with his battery to Fort Hamilton, N. Y., where he remained until 1898. In April, 1898, he was appointed aide-de-camp to Major General William Montrose Graham and later to Brigadier General A. C. M. Pennington, who commanded the Department of the Gulf with headquarters at Atlanta, Georgia. Upon the outbreak of the insurrection in the Philippines he joined the Fifth Artillery, sailed for Manila, and took part in various expeditions against the insurgents the following year. He was recommended to Congress for brevet in 1902.

He took part in the Boxer Campaign with Reilly's battery in the assault of the Chinese positions at Peitsang and Yangtsun. During the assault and capture of the Imperial City and the Forbidden City, his guns accompanied the storming troops. He was recommended to be a brevet major by the Commanding General of the American Forces. In 1901 he returned to the United States and was stationed at Fort Walla Walla, Washington, where he was promoted captain. In 1902 he was ordered to Alaska where he located and planned the construction of Fort William H. Seward. In 1903 he proceeded to Chickamauga Park, Georgia, for duty. In 1905 he was ordered to the U. S. Military Academy where he remained until 1911, when he was promoted to major and assigned to command of a battalion of the Third Field Artillery at San Antonio, Texas. In August, 1911, he was ordered to Fort Myer, Virginia, where he located and afterwards purchased for the Government the artillery range at Tobyhanna, Pa. From 1914 to 1917 he was on duty in the Militia Bureau of the War Department. He was promoted lieutenant-colonel in 1916, and colonel in 1917. In May,

1917, he proceeded to England and France, studying organization and training of the British and French armies.

In August, 1917, he was appointed brigadier general of the National Army and assigned to the command of the 67th Field Artillery Brigade of the 42d Division. On December 22, 1917, he took command of the First Artillery Brigade of the First Division and found the Division preparing to enter the line north of Toul. When the German drive began in March, 1918, the First Division proceeded to Picardy, where it took over the Cantigny Sector. In May, 1918, Cantigny was captured as a result of the first American offensive. In June, 1918, General Summerall was appointed a major general and was assigned to the First Division, which he commanded at Soissons and at St. Mihiel where the Division was charged with connecting with the attack on the west of the salient. He again commanded in the first phase of the Meuse-Argonne. One October 11, 1918, General Summerall was promoted to the command of the Fifth Army Corps, which occupied the center of the American line.

After the Armistice General Summerall commanded successively the Fifth and the Ninth Army Corps in France, and the Fourth Army Corps in Germany. He was one of the American generals invited to be present at Versailles at the signing of the treaty of peace. In July, 1919, he was appointed a member of the Allied Mission of Generals at Fiume. He returned to the United States in September, 1919. General Summerall then commanded the First Division at Camp Zachary Taylor, Kentucky, and later at Camp Dix, N. J. In the meantime he had been appointed a brigadier general in the Regular Army, January, 1919, and a major general in the Regular Army in May, 1920. In 1921 he assumed command of the Hawaiian Department, where he remained until 1924. Following his foreign service he assumed command of the Eighth Corps Area with headquarters at San Antonio, Texas, remaining there three months. On January 16, 1925, he succeeded Major General Robert L. Bullard in command of the Second Corps Area with headquarters at Governors Island, New York.

General Summerall was awarded the Distinguished Service Cross, the Distinguished Service Medal, and the Croix de Guerre with palm. He was decorated as Commander of the Legion of Honor by France, as Grand Officer of the Crown by Belgium, as Commander of the Order of the Crown by Italy, with the Order of Prince Danilo I by Montenegro, and with the Military Medal by Panama. General Summerall also wears the Spanish-American War Badge, the Philippino Campaign Badge with two silver stars, the China Campaign Badge with two silver stars, and the World War Campaign Badge with five stars for major operations.

Fire Control Method for Mortars

*Prepared by the
COAST ARTILLERY BOARD
under the supervision of the Chief of Coast Artillery*

I—INTRODUCTION.

1. In 1923 the Coast Artillery Board initiated a Project (No. 117) to develop an improved fire control system for mortars. An allotment of ammunition was obtained and the system was tested at *Battery Anderson*, Fort Monroe. The system was also tested in the Coast Defenses of Balboa, and later at Fort Monroe again.

2. The probability that the proposed system would apply not only to mortars but to the 16-inch and 12-inch long-range guns was indicated by the following indorsement, dated May 26, 1924, from the Office of the Chief of Coast Artillery to the Coast Artillery Board:

2. The 16" and 12" long range guns will undoubtedly be fired by Case III. It has occurred to this office that the data to be obtained from the test for mortars might be applicable to long range guns.

3. It is, therefore, desired that consideration be given to the possibility of applying to fire control methods for long range guns the data to be determined from these tests.

3. The objects of the development have been to obtain—

a. A practicable fire control system in which the delay now occasioned by a relay would be reduced to a minimum.

b. A practicable fire control system under which the rate of fire of mortars could conform more nearly than at present to the time necessary to perform the operations of loading and careful laying.

II—DISCUSSION.

A—PRELIMINARY CONSIDERATION

4. A primary consideration is that the system developed should accommodate itself progressively to the state of training of troops. Highly trained organizations have fired battery salvos with mortars every thirty seconds and without relay. Such performances are exceptional but they are, nevertheless, indicative of the rate of fire which can be attained with fixed seacoast mortars. The present mortar fire control system provides an observing interval of thirty seconds, a predicting interval of one minute, and a prediction every minute. The present system can be used with facility by inexperienced troops after a moderate amount of training, but, as the state of training improves, a more

rapid rate of fire than the present system permits can be attained and should be realized. A moderately well trained battery could fire salvos at intervals which should average 45 seconds. Some salvos might be 30 seconds apart; some one minute or more apart, but the majority of the salvos could be 45 seconds apart. An improved fire control system therefore should be flexible enough to permit of battery salvos being fired at intervals of 30 seconds, 45 seconds, one minute, one minute and 15 seconds, and so on.

5. Another consideration involved is that a minimum of time should be required for a relay. Under the system described by T. R. 435-221, the mortars are fired one minute from the time when prediction is begun. If, for some reason, a relay becomes necessary, it is two minutes before the pieces can be fired, because a new prediction must be used. To permit the flexibility discussed in the preceding paragraph, the time required to complete the operations in the pits incident to a relay should be less than fifteen seconds in a moderately well trained organization. Extensive tests at *Battery Anderson* during development of this project have demonstrated conclusively that a relay interval of fifteen seconds is a practicable one for such an organization, with some modification of the ordinary methods for laying in azimuth and elevation to be discussed in detail farther on in this paper. Here again, the state of training of troops must be accommodated by the improved system. Inexperienced troops after some training can fire every minute, using a relay interval of one minute if a relay becomes necessary. They really could do better, on a relay, if the system permitted, *i. e.*, an organization which could fire every minute, could relay in thirty seconds easily. As the state of training improves, a relay interval of fifteen seconds soon would become practicable. An improved mortar fire control system therefore should be flexible enough to permit relaying in fifteen seconds or thirty seconds.

6. *a.* To meet the preceding conditions as to firing interval and relay interval, it appears best to predict more frequently when the state of training permits, and, based upon these predictions, to interpolate or extrapolate for intermediate intervals of fifteen seconds. After a moderate amount of training a mortar range section easily can predict one minute ahead once in thirty seconds. This step is thoroughly practicable. It is impracticable, generally, to decrease the dead time to thirty seconds because, assuming that loading and prediction begin at the same instant, the corrected elevation and azimuth generally cannot be sent to the pits in time to permit the data to be set on the pieces by the next 30-second bell. An exception is an organization so highly trained that salvos can be fired every thirty seconds—in time of peace such an organization seldom can be developed.

b. In this connection it should be noted that the determination of a predicted point in Case III fire is prescribed in T. R. 435-221, "Fire Control and Position Finding." In peace time training the use of a predicted point in a thorough check-back system is useful. This practice does, however, impose additional labor upon the plotting details and others concerned with the application of predicted point data. In action it is to be questioned whether these operations should be required. The chief value of this practice in action would be to check the orientation of the fire control system. Once this orientation had been checked by use of several predicted points it appears desirable to discontinue the determination and use of predicted point data, thus simplifying the operation of the fire control system. It is the opinion of the Coast Artillery Board that the determination and use of predicted point data should be made optional by T. R. 435-221 provided a suitable check-back system is in use by the batteries. It should be noted in this regard that the setforward azimuth at target practices could be utilized satisfactorily by safety officers.

7. In the system developed at *Battery Anderson* predictions were made every thirty seconds. A dead time interval of one minute was used. Firing data for a point midway between the latest two predictions were obtained by interpolation on the range percentage corrector for elevation and on the deflection board for azimuth. The data for the end of the next fifteen and thirty seconds were displayed to the pits on every half-minute bell by the operators of a special display board. The time-interval system rang three bells on the minute and half-minute and two bells at fifteen seconds and forty-five seconds. The operator of the deflection board was connected by telephone to one of the special display board operators and the operator of the range percentage corrector to the other operator. It will be seen that the system, as developed, deviates but little from the standard system and possesses all the required flexibility.

B—THE FIRE CONTROL EQUIPMENT WITH CONSIDERATIONS FOR THE IMPROVEMENT THEREOF

8. The following equipment was used in the plotting room:

a. *Plotting Board*.—A new Cloke Plotting Board, Model of 1923, obtained from Frankford Arsenal was used in some practices; the 110° Plotting Board, Model of 1915, in other practices. Both were satisfactory. The operation of the boards is described in T. R. 435-221.

b. *Prediction Device*.—The Wells predictor and the pantograph predictor were tested by the plotting section at drill. Either of them would have been satisfactory. The plotting detail had become accustomed to the use of a prediction scale in conjunction with a device for deter-

mining the travel in yards to the setforward point from the last plotted observation. The last method of prediction was used at all practices and was satisfactory. The Stephens Predictor, Coast Artillery Board Project No. 419, has been developed since and is believed superior to the methods used in the test.

c. Range Correction Board.—Both the Range Correction Board, Model E, 1923, and the Pratt Range Board, Model 1905, have been used; the former, modified as described in COAST ARTILLERY JOURNAL for March, 1926, was entirely satisfactory. Percentage curves were used on the charts and operation was as indicated in T. R. 435-221. (See COAST ARTILLERY JOURNAL for March, 1926.)

d. A standard wind component indicator was used in the test.

e. Range Percentage Corrector.—A range-elevation board is a necessary adjunct to the fire control system of any mortar battery. The most suitable range-elevation board known to the Coast Artillery Board is the range percentage corrector described in T. R. 435-221. During the early part of the test proportional dividers were used for interpolation. Later the range percentage corrector was provided with an interpolating device.

f. Deflection Board.—Two types of deflection boards have been used in the tests:

(1) The deflection board for mortars, Model of 1906, with a new lateral wind and drift chart substituted for the De Carré drift chart. Various means of interpolating were tried but no satisfactory method was found. Due to the fact that when the azimuth cylinder is turned one notch it is necessary to move the carriage to the extreme right or left and the old azimuth reading is lost, it appears improbable that a satisfactory method of interpolating on this board will be found. A separate interpolating device with a continuous azimuth take was tried. This was unsatisfactory because of the time required for the various operations.

(2) The Coast Artillery Board Universal Deflection Board with interpolator. (See COAST ARTILLERY JOURNAL for May, 1925.) During the test this device was modified slightly but there was no change made in the principle of the board or in its operation. In its improvised form the Universal Deflection Board is subject to inaccuracies which it is believed will not exist in an arsenal constructed device. An arsenal constructed board is very desirable not only because of increased accuracy but because of increased speed in operation. Since the corrected azimuth can not be determined until after the corrected elevation is found, the corrected azimuth is usually late in getting to the pits and is the most frequent cause of relays. Furthermore, there is difficulty in

repeating back the azimuth to the plotting room as a check when it is late in getting to the pits.

g. Spotting Device.—Various devices were used during the tests. Any spotting device that meets the requirements of Coast Artillery Board Project No. 416 (See COAST ARTILLERY JOURNAL for January, 1926) will be satisfactory.

h. Impact Board (now known as the Adjustment Chart).—Both the impact board described in T. R. 435-221 and the Modified Impact Board (See COAST ARTILLERY JOURNAL for April, 1926) have been used during the tests. The Modified Impact Board was more satisfactory than the Impact Board.

i. Mechanical Display Board.—This is a device which can be operated mechanically from the plotting room to display data in both pits and has been installed at *Battery Anderson* for many years. It is realized that not all mortar batteries are equipped with mechanical transmission, but wherever such display boards can be installed, provision for the installation is desirable and should be carried into effect. The board should not be confused with the special display board used in this development, which is of an entirely different type. The combined use of both display boards was a feature of the development and was most satisfactory since the combination afforded a suitable check back on the firing data while permitting the necessary interpolations.

j. The time-interval system was altered to ring as indicated in Paragraph 7.

k. A change was made in the telephone communications between the plotting room and the pits. Two men operated the special display board in the pits. Each operator wore a headset. One was connected to that operator on the deflection board in the plotting room who performed interpolation in azimuth. The other was connected to that operator on the percentage corrector who performed interpolation in elevation. These communications functioned satisfactorily.

9. The following fire control equipment was in the pits:

a. A display board connected directly with the mechanical transmission device in the plotting room as mentioned in paragraph 8 *i*, above.

b. A special display board on which all data were posted. This functioned satisfactorily throughout (See Fig. 1). Attention is invited to Paragraph 8 *k*, above, and to Paragraph 10, below.

10. The special display board (Figure 1) was simple and inexpensive. It was made of heavy rough lumber procured locally. A heavy double-faced blackboard was mounted in the frame as shown. The operators stood in rear of the board, recorded the data telephoned to them from the plotting room and turned the board to the pits every

thirty seconds on the bell. A design for the board is shown in Figure 2 and is self-explanatory. It should be made locally by batteries for which desired.

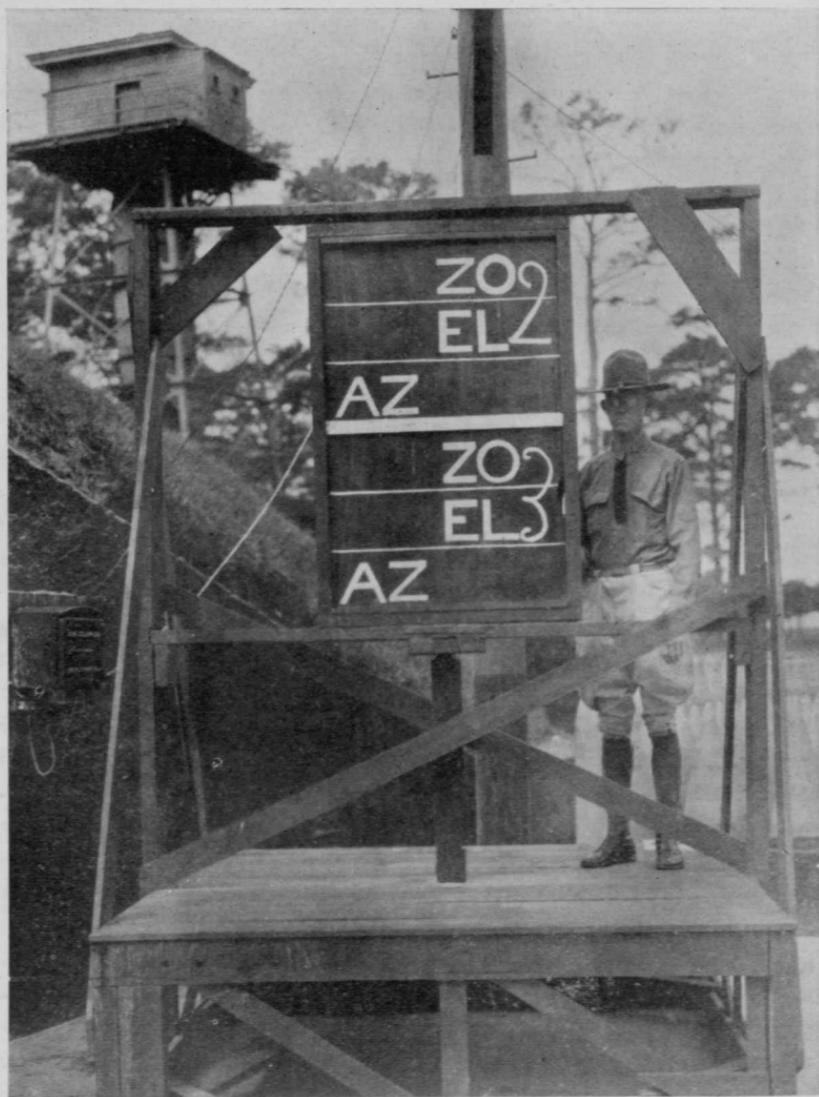


FIG. 1

C—OPERATION OF THE SYSTEM

11. The detailed operation of the fire control system follows, with slight deviations, that described in Coast Artillery Board Project No. 75, "Fire Control System for 155-mm. Guns," published in the August,

1924, COAST ARTILLERY JOURNAL. Predictions for firing one minute ahead were made every thirty seconds. The operation of the plotting board was normal. The operation of the Range Correction Board, Impact Board, Spotting Device, Wind Component Indicator, and prediction devices was as usual; the operation of the range percentage corrector, deflection board, and mechanical display board but slightly varied. The detailed operations of these devices are described in T.R. 435-221, "Fire Control and Position Finding," the report on Coast Artillery Board Project No. 75, and references contained in that report. It will be seen that only in frequency of prediction and in interpolation between predictions was there any material change from the present system.

12. For the Coast Artillery Board Universal Deflection Board, with interpolator, two operators, A and B, were required. A, connected by telephone to the azimuth operator of the special display boards in each pit, set the uncorrected azimuth of the setforward point. B set the slide of the deflection board at the intersection of the proper cross wind and drift curve with the line corresponding to the corrected elevation. A then read the corrected azimuth of setforward point and telephoned it to the pits; while he was doing this he was also interpolating and he next read the interpolated azimuth and telephoned it to the pits. A applied any azimuth corrections ordered. NOTE.—In changing zones no interpolation was or could be made.

13. In the pit the two operators of the special display board were stationed in rear of the board. Each was equipped with chalk and an eraser. They were men selected for ability to make legible figures. It will be noticed in Figure 1 that the spaces for data on the two sides of the revolving blackboard were echeloned so as to minimize interference when men were writing data simultaneously. The operators will be designated in this discussion as C and D. C recorded zone and elevation and was connected to operator of range percentage corrector interpolator. D recorded azimuth and was connected to operator A of paragraph 12, above. As noted, the time interval bell rang three times on the minute and half-minute intervals and two times at fifteen seconds and forty-five seconds. With sufficient training, all of the operations within the range section, including the posting of data on the special display board in the pit, can be completed on an average of twenty-five seconds after the three bells on which each prediction is begun. The special display board was turned to the pit exactly on the third note of the three bells following the three bells on which the prediction began, or about five seconds after the data were posted. Data received by C and D provided for laying the mortar on the *next but one* ringing of three bells, and these data were displayed thirty seconds in advance of firing time by turning the board on the *next* 3-bell ring. Before

the board was turned, interpolated (2-bell) data were received and these data were for firing on a 2-bell ring preceding the time for 3-bell data just mentioned. So the board when turned displayed:

- Data for firing thirty seconds later, marked 3.
- Data for firing fifteen seconds later, marked 2.

The recorder and pit commander could check the data marked 3 against those showing on the mechanical display board. (See paragraph 19 below.)

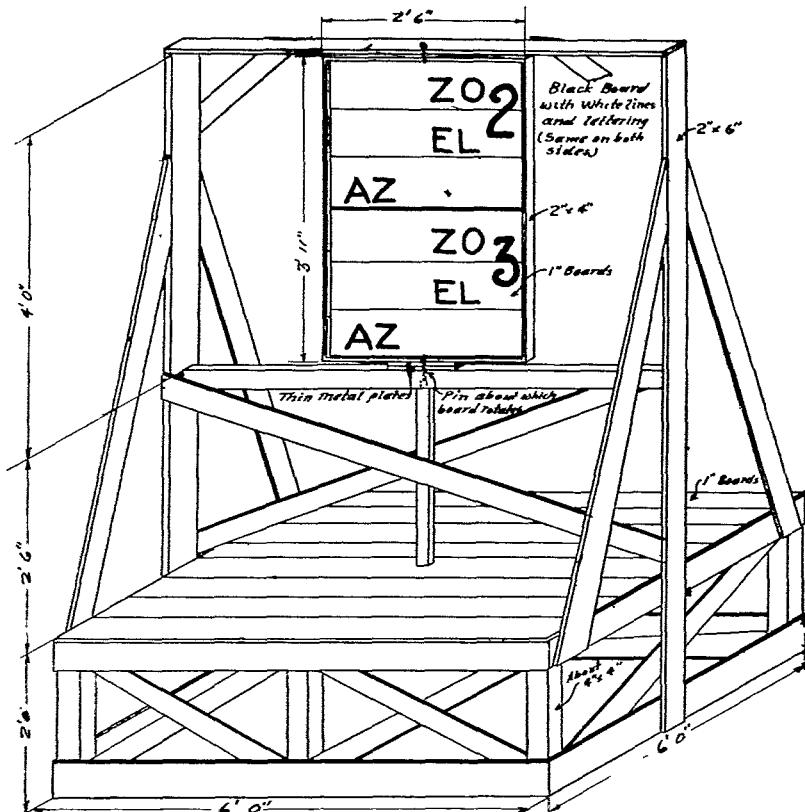


FIG. 2

14. It will be noted that invariably the display board was turned promptly on the last stroke of every 3-bell ring. In the earlier stages of the drill, data for the 15-second bells frequently were not written on the special display board at turning time, but data for the 30-second or minute bell were ready as a rule. It should be noticed that new data for the half-minute or minute rings appeared on the mechanical display board a few seconds before the special display board was

turned, *i. e.*, new data appeared on mechanical display board before firing instant for the old data. The special board was held so as to display the data in use until firing time. As the stage of training improved both sets of data were written on the special board, as a rule, when time came to turn it, and there was time available for "repeats" between the operators on the display board and the operators in the plotting room.

15. A recorder in each pit recorded all data displayed and compared the 3-bell data shown on the two display boards. If 3-bell data did not check he signalled the fact to the pit commander who commanded "relay." The recorder also noted whether the intermediate 2-bell data shown on the display board were approximately half-way in magnitude between the 3-bell data then displayed and last preceding 3-bell data he had recorded.

16. Under present regulations a recorder is required in the emplacements and pits of all batteries. It is desirable to provide a means for continuing the fire of a battery during periods of interrupted communications between plotting room and pits or emplacements. The Board has devised a means for recording easily firing data sent to, or displayed in, the pits or emplacements, for checking interpolated data or predicted data after several predictions have been obtained, and, when communications to the plotting room are interrupted, for continuing the flow of reasonably accurate firing data to the guns for a short period of time. The device is called a check-back board.

17. *a.* The check-back board referred to is simple and requires but one operator—the recorder. It consists, in the case of mortars, of a time-elevation spiral (of the type described in Coast Artillery Board Project No. 75) mounted adjacent to an 8-inch by 20-inch piece of 10/10 cross-section paper on a drawing board twenty inches square. Figure 3 is a photograph of the device.

b. The time-elevation spiral is graduated in elevations corresponding to each ten yards of range in each mortar zone. The cross-section paper shown above the spiral is numbered in azimuth to a scale of one inch equals one degree to cover the field of fire of the battery. Pieces of vellum paper are tacked over the spiral and the cross section paper.

c. The operator records the zone and elevation shown on the special display board by a pencil check mark on the vellum at the elevation for the indicated zone. Similarly he makes a check mark on the cross section paper at the azimuth shown. The data can be synchronized by indicating "time 10," "time 20," etc., by figures or symbols penciled on the vellum.

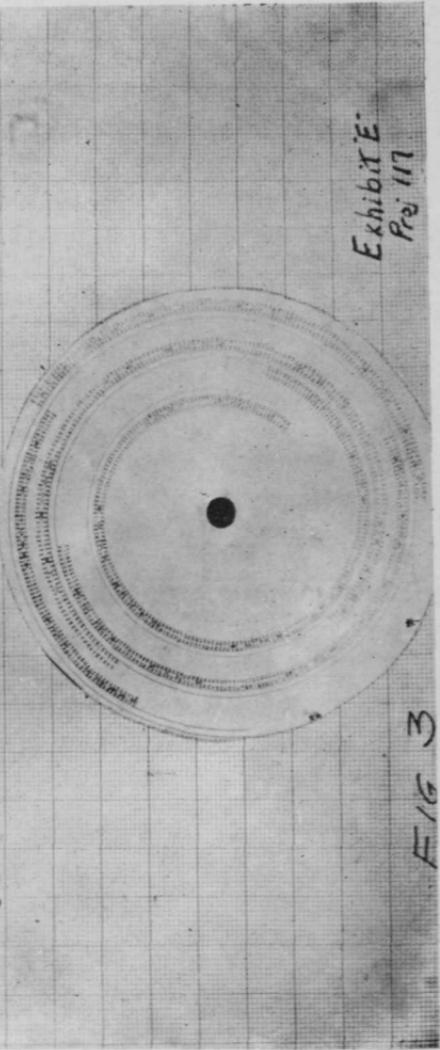
d. The distances between successive check marks on the device affords a check upon the accuracy of succeeding predictions and inter-

Exhibit E
Page 117

E 16 3

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
0	9	0	7	6	5	4	3	2	1	0	9	0	1	2	3	4	5	6	7	0
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
0	9	0	7	6	5	4	3	2	1	0	9	0	1	2	3	4	5	6	7	1
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
0	9	0	7	6	5	4	3	2	1	0	9	0	1	2	3	4	5	6	7	0
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
0	9	0	7	6	5	4	3	2	1	0	9	0	1	2	3	4	5	6	7	0
0	1	2	3	4	5	6	7	8	9	0	0	1	2	3	4	5	6	7	8	0
0	9	0	7	6	5	4	3	2	1	0	9	0	1	2	3	4	5	6	7	1

6



polations. The procedure indicated in c above minimizes the labor of recording Case III firing data. When communications to a plotting room have been interrupted the rate of change in range and azimuth can be made use of in predicting azimuth and elevation for a short time.

18. The check-back board referred to above was not used in the last firings. Data were checked back over the telephones to the operators in the plotting room. Pieces were laid in azimuth in the usual manner. By means of a straight edge bolted to the racer and projecting therefrom each laying in azimuth was indicated by a chalk or pencil mark. Any irregularity in the separation of these marks indicated to the pit commander that his data were inaccurate and he ordered relay. During these firings a time-azimuth check board, as described in T. R. 435-221, was operated in the plotting room as a further precaution.

19. The pit commander, knowing the capabilities of the gun sections under him, selected and announced to the section the data to be used in laying. The announcement of "two-bell data," "three-bell data," or "relay" by the pit commander served to indicate to the mortar sections and, by phone, the B. C. station the particular data posted on the special display board upon which it was expected the pieces could be fired. When the pieces had been laid, the gun commanders notified the pit commander of that fact by suitable signal. The pit commander notified the battery commander's station by signal (one ring on 30-second and two rings on 15-second) that the pieces were ready to be fired.

III—TESTS.

20. On May 7, 1924, the Battery Officers' Class from the Coast Artillery School fired two very good service practices at *Battery Anderson*, Fort Monroe, using most of the methods described.

21. The Battery Commander at *Battery Anderson*, who had familiarized himself with, and aided in, the development of the special methods and devices, obtained permission to use them in his annual service practice. In May, 1924, two service practices were fired satisfactorily. Again on May 24, 1924, during the Centennial Exercises at Fort Monroe, these methods were used at service practice with satisfactory results. During the summer of 1924 the C. M. T. C., R. O. T. C., and National Guard units assigned to *Battery Anderson* found no difficulty in firing by these methods.

22. The Coast Artillery Board on September 29, 1924, submitted to the Chief of Coast Artillery its report on Project No. 117, "Fire Control Methods for Mortars," which included the following recommendations:

29. *a.* That the fire control equipment of each fixed mortar battery be completed to include the following:

- (1) A plotting board.
- (2) A prediction device.
- (3) A Pratt Range Board, Model 1905, with charts of percentage curves and with a correction scale and index therefor.
- (4) A wind component indicator.
- (5) A range percentage corrector.
- (6) A deflection board.
- (7) Two pairs of proportional dividers of suitable span.
- (8) An impact board.
- (9) A spotting device.
- (10) The sending elements of a mechanical display board for each pit.

Concerning this recommendation, in many batteries a plotting board, prediction device, deflection board, and the sending elements of mechanical display boards are available. The additional materiel, for which some funds may be required, are the wind component indicators and Pratt Range Boards with correction scale and index; in the case of these items some materiel may be available from abandoned Coast Artillery posts. As a temporary measure, the range percentage corrector, impact board, and spotting device can be improvised locally at little or no expense in accordance with instructions and plans which can be furnished by the Coast Artillery Board.

b. That the equipment in each pit include:

- (1) A mechanical display board.
- (2) A special display board.
- (3) A check-back board.

Concerning this recommendation, many batteries are provided now with a mechanical display board connected to the plotting room. Where these boards do not exist, and it is practicable to install one, it should be constructed by local personnel. The cost of the materials necessary for such a device is not great. The special display boards can be made locally from salvaged lumber in accordance with plans which can be furnished by the Coast Artillery Board. A check-back board can be improvised locally at little or no expense.

c. That the procedure covered in the above discussion be authorized for all fixed mortar batteries. It is the intent of this recommendation that, if approved by the Chief of Coast Artillery, the service at large be informed as to the exact nature of this development and then authorized to install and use same.

d. That authority for local changes in communication routes and changes in time interval signals which will conform to Par. 23 *o* and *n* be given coincidentally with approval of the above recommendations.

23. The proposed fire control system was next tested in the Coast Defenses of Balboa in April, 1925. The report of this test was sent to the Coast Artillery Board for remark and recommendation. Extracts

from the report of the critique and remarks of the Coast Artillery Board thereon are quoted:

Extract from report of critique:

3. *a.* The attempt was made during this firing to give the system of Fire Control for Mortars (Coast Artillery Board Project No. 117) as thorough a test as possible. Since the strength of the battery will permit its manning only two mortars, one mortar in each pit was used to simulate, as nearly as possible, the conditions for firing battery salvos, thus utilizing both special display boards.

Battery salvos were fired at different intervals from thirty seconds to one minute and forty-five seconds in order thoroughly to test out the feature which makes it possible to fire at any 15-second interval which the state of training of the command may allow. The 2-bell and 3-bell data were both used so as to test the flexibility of the system by making either set of data equally available. In only one case was the wrong data taken from the display board.

It was believed that a more thorough test could be accomplished if both pits were required to fire simultaneously, and this was done, one pit being given a relay if it reported ready when the other pit did not. This was necessary on the 7th, 12th and 13th salvos, due to trouble in one pit other than setting of data.

The following table shows the time necessary to load and fire, and the reasons for relays:

Salvos	Time from Commence Firing to Shot		Bells fired on	Relays	Cause
	Minutes	Seconds			
1		15	3	0	Battery was already loaded.
2	1	15	2	2	1 wrong data. 1 poor prediction.
3	1	00	2	1	No data.
4		45	2	1	No data to B. C.
5		45	2	0	
6		30	3	0	

Fire 6 salvos ordered: time from preceding shot

7	2	15	3		Breech hit by projectile. Changed guns. Other pit ready each bell.
8		45	2	0	
9	1	45	2	4	Relays from BC Station.
10		45	2	0	
11		45	3	0	
12	1	15	2	2	Misfire, B pit, previous shot.
13	1	15	3	2	Misfire, B pit, previous shot. Changed one projectile to A pit.

Remark by the Coast Artillery Board:

3. a. It is believed that where only two mortars can be manned the salvo should be fired from one pit. If one display board will work, two will. The pit conditions are much more difficult when both mortars are fired from the same pit, due to the increased concussion and general pit activity. A more thorough test of the system will result.

Extract from report of critique:

3. b. Operators of the special display boards interfered with each other in checking back data to the plotting room. In this practice it was found necessary to have the men on one board only repeat the data. The greatest difficulty experienced in preparing for this practice was encountered in training the operators on the special display boards. These men must not only be able to write quickly, accurately, and legibly, but they must also be exceptional telephone operators, able to hear and talk over the telephone in spite of the noise of ramming, operating the breech, and the great concussion in the pits when the mortars are fired. They should also be men who do not become confused during the actual firing. This is especially true of mortar pits which are enclosed in the rear. Unless these men can supply the data to the guns quickly and accurately, the work of the plotting section is nullified.

Remark by the Coast Artillery Board:

3. b. It is true that the check-back system is burdensome and requires men of high type, especially for the special display boards. It is considered, however, that each battery should have a suitable check-back, either in the form described in Coast Artillery Board Project No. 117 or as devised by the Battery Commander and approved by proper authority. In this connection, attention is invited to Par. 8 b of Project No. 117, in which the Coast Artillery Board advances the opinion that it is desirable to discontinue the determination and use of predicted point data, subject to requiring a suitable check-back system. This procedure would simplify the operations of the fire control system in Case III firing. It should be noted that for a safety precaution at target practice the azimuth of the setforward point could be utilized satisfactorily by safety officers.

Extract from report of critique:

3. c. It is noted that range elevation board and deflection board operators performed all duties connected with getting out 15-second data except actually operating the dividers. An attempt was made to have the ordnance put on a permanent adjustable dividing device on the read pointer on both of the boards. However, the personnel did not have sufficient time to develop this. It is believed that, if this method of plotting is adopted for general use, such a modification of the boards could easily be made and would be more satisfactory, as well as reducing the personnel in the plotting room by two men.

Remark by the Coast Artillery Board:

3. c. The Coast Artillery Board concurs in the opinion that interpolation on the range-elevation board and the deflection board should be accomplished by a permanent adjustable device rather than by means of proportional dividers, as now prescribed. Devices similar to the interpolator on the range percentage corrector are under test by the Coast Artillery Board; and it is believed that the use of these devices will result in a saving of time in the plotting room.

Extract from report of critique:

3. d. It appeared to be difficult to instruct a man to operate the time-elevation spiral rapidly. This was possibly due to the fact that the scale of the spiral was too small. The operation of the time-azimuth check, the chart of which was a straight line, was relatively easy. It is possible that a straight-line, time-elevation check chart could be devised that would require less training for its operation and at the same time include the equally spaced range scale feature, probably one zone on each horizontal line.

Remark by the Coast Artillery Board:

3. d. It is believed that a time-elevation spiral built to the proper scale will work satisfactorily. The difficulty with the spiral in question was doubtless due to the fact that the print used was too small a reduction. The time-elevation spiral and time-azimuth board do permit of extrapolation in case of a failure of communications between plotting room and emplacement. These devices will probably be replaced by the plotting room interpolators if the tests of the latter prove successful.

Extract from report of critique:

3. e. There was no method prescribed for interpolating data for the 2-bell predicted point for the B. C. instrument. The following system was worked out and gave very satisfactory results:

At about the time of the three bells, the observer at the B. C. instrument received the data for the predicted point thirty seconds in advance; he set that data, noting how many turns of the handwheel it required. He then turned the handwheel back halfway, measuring the distance by the number of turns. This gave an approximate setting for the 15-second interval, which proved to be sufficiently accurate.

Remark by the Coast Artillery Board:

3. e. The scheme for interpolating data for the 2-bell predicted point is ingenious and very simple. The Coast Artillery Board is in favor, however, of discontinuing the use of the predicted point, as stated above.

Extract from report of critique:

3. f. During the firing of fifteen shots in the maneuvers, held April 1 to 10, 1925, elevations were set by the elevation scale and were not checked by

quadrant. During this firing, the quadrant check of the elevation was not used. It is believed that, since the quadrant check is not a safety precaution, it could well be omitted.

Remark by the Coast Artillery Board:

3. f. A check by gunner's quadrant of elevation set by the elevation scale is considered desirable.

Extract from report of critique:

3. g. The system requires that, to fire at a rate greater than that allowed by the present system, namely a salvo every minute with a 30-second relay, requires that the salvo interval be reduced to forty-five seconds and the relay interval to fifteen seconds.

This requires that the plotter get his data off his board ten seconds sooner than the old system, to allow the men with the proportional dividers time to secure their interpolated data and to write the data on the special display boards. This does not present any serious difficulties as long as the course of the target is regular, as it is in most target practices. However, with a fast target or one not running on a uniform course, it is not believed that the plotter would have sufficient time to place his setforward point with the care required.

Remark by the Coast Artillery Board:

3. g. The Coast Artillery Board has now under study the question of the desirability of entering the deflection board with the actual range instead of a corrected range for the purpose of determining wind and drift corrections. Should it be decided to use the actual range when called off the plotting board, a saving of time in the plotting room would result which would be of value. It is expected that improved interpolating devices will also save time, as stated previously.

Extract from report of critique:

3. h. While it is realized that a 30-second relay system allows more time than is necessary for even a moderately trained organization, still it is believed that a 15-second interval goes to the other extreme, in that a well-trained battery is pushed to such a rate of speed that accuracy is apt to be sacrificed.

Remark by the Coast Artillery Board:

3. h. A 15-second relay system is entirely practical if the entire gun crew thoroughly understands the system and is sufficiently trained.

Extract from report of critique:

3. i. An additional safety precaution which is suggested, is the separation of the 2-bell and 3-bell data, so that the danger of setting the wrong data is obviated. No method of accomplishing this end has been suggested which does not increase the personnel required.

Remark by the Coast Artillery Board:

3. i. The separation of the 2-bell and 3-bell data might be accomplished by sawing the display board horizontally in halves and by turning each part fifteen seconds before it is due to be used.

Extract from report of critique:

3. j. Of the above, *b* and *h* can be overcome by sufficient training of the personnel.

4. CONCLUSIONS.

The experience of this battery indicates that the following modifications should be made in the method of fire control as described in Coast Artillery Board Project No. 117.

a. That a modification be made to the deflection and elevation boards, whereby interpolated data can be obtained directly from a scale attached to the board, thus eliminating the use of the proportional dividers and the services of two men. This modification should be one that could be made, or at least attached, locally.

b. That either a large scale time-elevation or straight-line chart be supplied to batteries by the Coast Artillery Board.

c. That a method of supplying interpolated data for the 15-second intervals for the B. C. instrument be included in the method.

d. That a method be devised, if possible, of separating the 2-bell and 3-bell data. The only suggestion is to use the mechanical display board for the regular data and the special display board for the interpolated data.

e. The provision for supplying interpolated data should be separate but superimposed on the regular system. This would simplify training of batteries already well trained in the old system.

Remark by the Coast Artillery Board:

4. e. It is considered that the new system is already superimposed on the regular system. If any break-down occurs a steady flow of 3-bell data is insured.

Extract from report of critique:

5. RECOMMENDATION.

It is recommended that the system, with such of the above modifications as may be adopted, be given a thorough test throughout the Coast Artillery, with a view to its adoption in some form as the regular fire control system for mortars.

24. An extract from 1st Indorsement, Headquarters, First Battalion, 4th Coast Artillery, and remark by the Coast Artillery Board thereon are quoted:

2. b. Considering the numerous other activities of the battery during the time the test firing was under consideration and the consequent short period of actual drill on the fire control method as described by the Coast Artillery Board, it is seen that this system can be adopted and used by

any moderately well-trained battery in a relatively short time, provided intensive drill is possible.

4. The Coast Artillery Board is of the opinion that Par. 2 b, 1st Ind., on the report of the experimental target practice; Par. g, 3d Ind., thereon, and the recommendation, Par. 5, Report of Critique, support the original recommendations of the Coast Artillery Board in report on Coast Artillery Board Project No. 117.

25. In September, 1925, Project No. 117 was returned to the Coast Artillery Board by Indorsement from the Office of the Chief of Coast Artillery for further study and test. An extract from that Indorsement is quoted below:

Your remarks contained in the 14th Ind. hereon are concurred in with minor qualifications as follows:

3. h. It is not believed that there has been sufficient practice by trained crews under varying conditions to justify the conclusion that a 15-second relay system is entirely practical. It is believed that this will have to be established after further trial.

3. i. It is not believed that the problem of separating the 2-bell and 3-bell data has been satisfactorily solved.

26. The proposed fire control system, including the Coast Artillery Board Universal Deflection Board with interpolator,* Range Percentage Corrector with interpolator, and the latest form of Range Correction Board, was used by Battery C, 12th Coast Artillery, in its regular target practice on May 20, 1926. There was no confusion or difficulty in separating the 2-bell and 3-bell data. There were several relays during the practice, each being made within fifteen seconds. Upon one occasion there were two consecutive relays each made within fifteen seconds.

IV.—CONCLUSIONS.

27. The Coast Artillery Board believes that the objects of the development have been attained, that the proposed fire control system provides—

a. A practicable fire control system in which the delay now occasioned by a relay would be reduced to a minimum.

b. A practicable fire control system under which the rate of fire of mortars could conform more nearly than at present to the time necessary to perform the operations of loading and careful laying.

28. The mortar fire control outlined in the above discussion is practicable. It is flexible enough to accommodate the state of training of troops. It is a simple modification, or rather extension, of the present system. It typifies the fact of a common doctrine for seacoast

artillery as evidenced in the above discussion, in the report on Coast Artillery Board Project No. 75, and in the prescribed method for firing seacoast guns by Case III.

29. The development outlined above makes practicable an increased rate of fire and a reduced relay interval for fixed seacoast mortars. Because Case III fire undoubtedly will be a method used by 16-inch and 12-inch long-range guns, it appears evident that the fire control methods and materiel involved in the foregoing study furnish a suitable basis for the development of materiel and methods for long-range batteries. However, considerations as to visibility, rate of fire, practicable prediction interval and relay interval, and other factors will affect the development of materiel for these heavier weapons.

30. For fixed seacoast mortars it is practicable to use an observing interval of thirty seconds, a dead time interval of one minute, and to predict every thirty seconds when desired. It is practicable to interpolate between such predictions and to make both predicted and interpolated data available for use by mortar pit sections. A relay interval of fifteen seconds is practicable of attainment. A relay interval of thirty seconds can be obtained easily when predictions are made every thirty seconds.

31. An improved mortar fire control system should include the following:

- a. Position finding and observation service in which the locations of stations are such as to utilize to the fullest extent those favorable geographical features of a particular vicinity which will serve the battery best under various conditions of visibility.
- b. Plotting board.
- c. Prediction device.
- d. Wind component indicator.
- e. Pratt Range Board, Model 1905, with a correction scale and percentage charts. (This board should be modified into the Range Correction Board, Model E 1923, as described in COAST ARTILLERY JOURNAL for March, 1926.)
- f. Range percentage corrector with interpolator.
- g. Deflection board with a combined wind and drift chart and interpolator.
- h. Impact board.
- i. Spotting device.
- j. Mechanical display board in each pit.
- k. Special display board in each pit.
- l. A method of checking back data from pits to plotting room.
- m. Time interval signals of three bells on the minute and half minute and of two bells on the intermediate 15- and 45-second intervals.

n. An improved meteorological message which will include ballistic wind values to the heights of the maximum ordinates of mortar fire. In this connection it is realized that measurements to these heights seldom can be made. However, estimations to these heights based upon local records should be made by trained meteorologists where measurements cannot be had, and these estimates should be furnished to the batteries.

32. In preparation for target practice, or action, the battery commander can judge for himself as to what rate of fire his organization is capable of attaining, and he can adopt for target practice or action the procedure best suited to the state of training of his troops. That is, if in a particular organization, the range section is not sufficiently well trained to predict every thirty seconds then the battery can fire each minute using a minute relay; if the range sections can predict with consistent accuracy every thirty seconds, but the pit sections cannot relay consistently in fifteen seconds, then the battery can fire every minute using a 30-second relay; if the range section can predict every thirty seconds with consistent accuracy and the pit sections can relay consistently in less than fifteen seconds, then the battery can fire salvos which will average forty-five seconds apart; and as the battery approaches the peak of efficiency throughout, salvos thirty seconds apart will be fired more and more frequently.

33. A salvo every thirty seconds with no relay appears the utmost to be expected with present seacoast mortars. A few organizations capable of this have been developed in the past, and few will be developed in the future except in war time, but the methods described herein are believed to be well adapted to the highest rate of fire that the state of training will admit.

O. C. C. A.—The Chief of Coast Artillery appreciates the necessity of a reduction in the time now required under the procedure of T. R. 435-221 in the case of a relay in fixed mortar battery firing and further believes that under service conditions the utilization of the predicted point of the target by the battery commander in the cycle of fire might well be dispensed with during the fire for effect phase. However, at this time, it is not considered advisable to change radically the method of position finding for fixed mortar batteries now given in T. R. 435-221 by the adoption of the system described in this article.

It is desired that further firings be held under this method by the service at large and authority for such action is contained in Coast Artillery Memorandum No. 7, War Department, 1926. Should a study of the results of these firings indicate the superiority of this proposed system over the present one, further consideration will be given to adopting it as the standard method of position finding for fixed mortar batteries.

Address at Fifth Annual Convention, Reserve Officers' Association of the United States

By MAJOR GENERAL JOHN L. HINES

IT gives me pleasure again to attend a convention of the Reserve Officers' Association of the United States. During my four years in the War Department I have come to know thoroughly the commendable purposes and accomplishments of this Association. Your support and interest not only have been an incentive to our efforts, but have caused you to give us much valuable assistance and advice.

Your annual conventions constitute an excellent occasion upon which to analyze our progress in the fulfillment of the National Defense Act. Such an analysis is highly desirable if we are to secure that benefit from experience which is essential to progress. Therefore, in my talk of today I will attempt to discuss those current subjects which I consider most important in our field of common interest.

When we look back we find that distinct gains have been made with the project for the Organized Reserves. Our satisfaction with that progress depends upon the basis by which we measure our condition. If we apply the standard of our enthusiastic expectations after passage of the National Defense Act of 1920, then we are bound to feel disappointment. On the other hand, if we consider the advance of the Organized Reserves with respect to other elements of the Army of the United States, then we may feel elated. Of course, satisfaction should be tempered by realization of the fact that the Organized Reserves were due to make comparatively greater strides by reason of their more recent creation.

In 1922 provision was made to train 630 reserve officers for fifteen days, under the limitations of an appropriation of \$250,000. In 1926 provision was made for fifteen days' training of 16,000 reserve officers under an appropriation of \$3,674,800. Distinct progress has been made with respect to the organization and procedure to assure full consideration for the Organized Reserves. Before the World War administration of all military elements, except the Regular Army, was largely centered in the War Department. The National Defense Act provided a basis for the decentralization our World War experience had indicated as essential to a speedy mobilization. Such a step meant that an increased scope of interest was apportioned to chiefs of branches, supply services, and territorial commanders. Work upon the

mobilization plans served to initiate all these offices into the problems of our new organization and I believe they now are prepared to serve well the interests of all components of the Army of the United States.

Within the War Department all offices are so organized that each problem is considered with respect to its effect upon the Organized Reserves as well as all other components. It has been our constant endeavor so to organize as to realize the one-army idea. To do this we follow the guiding principle that any proposed action must be considered with respect to its effect on each and every component.

Distinct progress has been noted in local combinations of interest between the Organized Reserves and Regular Army. The longer these two components work together, the more will they appreciate each other and the better will they be prepared to interchange personnel to suit the requirements of a general mobilization.

The procurement of reserve officers has progressed throughout the year. In September the increase by procurement amounted to 1994 reserve officers, 1111 being in the grade of second lieutenant. The total strength of the Reserve Corps, exclusive of those holding both Reserve and National Guard commissions, is 97,878. The losses during the last month amounted to 337, making a net monthly gain of 1657 reserve officers. The losses were mainly due to death or to failure of reserve officers to sign the form required prior to issue of a new commission. There has been a steady increase for a number of years without any definite provisions for elimination and discharge. There are at present about 30,000 unassigned reserve officers of whom the majority—about 20,000—are in the grade of second lieutenant. The other 10,000 unassigned officers are generally surplus in the grades of colonel, lieutenant colonel, and major. This surplus of 10,000 officers in higher grades, due to promotion of former emergency officers, is in excess of the entire requirements of the plans for six field armies.

An interesting comparison is obtained from the figures on the officers who were in the Regular Army, National Guard, and Reserve Corps in June, 1926, and the officers who, on November 11, 1918, were in the American Expeditionary Forces. The overseas strength, including men en route, was at that time 2,003,935. We now have 62 major generals as against 62 in the A. E. F. on November 11, 1918; 227 brigadier generals as against 197; 1814 colonels as against 773; 4241 lieutenant colonels as against 1348; 13,271 majors as against 4995; 28,994 captains as against 17,255; 31,269 first lieutenants as against 27,313; and 48,397 second lieutenants as against 31,059. The June total was 128,275 as against 83,006 in the A. E. F.

Another point which merits our consideration is the respective ages at which officers may attain corresponding grades in the Officers' Re-

serve Corps and in the Regular Army. Of two young men entering the military service at the age of twenty-one, it is possible for the one who goes into the Reserve Corps to attain the grade of major at the age of thirty-one, whereas the other probably would not attain the same grade in the regular service until the age of forty-eight. Similarly, the officer in the Reserve Corps might reach the grade of colonel at the age of thirty-nine, whereas the one in the regular service probably would not reach that grade until the age of sixty-one.

Many reserve officers have expressed dissatisfaction at the present system of assignment and promotion. Figures indicate that collectively reserve officers have received more than a full share of rank. However, there undoubtedly exist many inequalities which justify a feeling of discrimination between individuals. Such inequalities were not entirely avoidable. The War Department did not wish to lose the valuable interest and services of the World War veterans, so proceeded with the organization of the Officers' Reserve Corps before completion of the initial mobilization plans which were essential to the ascertainment of requirements by grade in commissioned personnel.

The assignment of reserve officers is closely connected with the question of promotion. Some assigned officers are unable to devote any time to military activities. This throws an additional burden on those other officers who endeavor to maintain a high standard for their unit. A further difficulty lies in the fact that some surplus officers are attached to units and feel that such a position tends to unfavorable discrimination against them in the matter of promotion.

We can not hope to undertake much advance in the scope of active training. Even were the appropriations to be made available, existing facilities would soon reach the limit of satisfactory utilization. Some improvements will be made in the method of apportionment of funds for training. We propose to institute a procedure which not only will give training to the maximum number of officers, but also will enable designation a sufficient time in advance to permit full personal arrangements and other essential preparation.

The Officers' Reserve Corps has reached a total that assures an adequate number of reserve officers for the initial requirements of our mobilization plans. To my mind, there are four definite ends to which we should now devote our attention with a view to improvement of the Organized Reserves. First, we may increase the value of active training. Experience has already brought progress in this respect, but we should continue thought and experiment with a view to securing the greatest possible benefit to reserve officers. Another objective is to make provision that active training becomes available to those officers through whom it will bring greatest benefit to the nation. Improvement of the

standard of inactive training is a third objective, and last, but not least, it is desirable to increase cohesion by improvement of the *esprit* and teamwork of units.

Our present problems may be summed up in the category of quality rather than of quantity. Final analysis shows this quality will depend on the individual enthusiasm and interest of the members of the Officers' Reserve Corps. The Organized Reserves will continue to be representative of the voluntary and patriotic contributions of time and interest by reserve officers.

The Reserve Officers' Association has rendered valuable assistance to the development of the reserve project. Your members have been instrumental in carrying the movement forward from the inception of the idea to its present advanced development. They have personal knowledge of the degree of success which meets various measures and are capable of giving advice on the feasibility of proposals for remedial action. I hope that this Association will continue to exercise its invaluable services in sponsorship of the reserve movement.

In this, my last appearance before your convention prior to relinquishment of the office of Chief of Staff, I thank the officers and members of the Reserve Officers Association for their loyal and valuable efforts in behalf of our national defense. You and your fellow members have given unstintingly of your time and resources. It is a highly patriotic service for which you have earned the gratitude of your country. With a full appreciation for its value, I wish the Association every success in a continuation of its activities and endeavors.

Before we could begin to head up our industrial, scientific and labor resources, we had to make a rather hasty survey, a too hasty survey, of what we had and what the national balance was in making war through its industrial resources. So when the war caught us we had to plunge into the situation in many respects without that thoroughgoing study which we should have had in time of peace.—*Grosvenor Clarkson, Director of the Council for National Defense.*

“77 Rounds Fired, Sir”

By CAPTAIN WILLIAM C. BRALY
63d Coast Artillery (AA)

FIRST PRIZE TARGET PRACTICE ESSAY CONTEST

“77 rounds fired, Sir.” Thus ended a recent night target practice by an antiaircraft gun battery in which four rounds were fired every five seconds of firing time, at a sleeve target $2\frac{1}{2}$ feet by 10 feet long, towed at 87 miles per hour, more than two miles from the battery. Tangible results: more than 300 shrapnel holes in the target.

The following description of this practice is submitted in the hope that at least some of its features may prove of interest and benefit to the service in general and to other antiaircraft organizations in particular.

The guns used were the 3-inch 1918 trailer mounts, with standard A. A. fire control instruments. A slight modification in the lateral sighting mechanism had been installed, in that the pointer had been fastened to the lateral deflection scale by means of two small screws. Thus when the lateral deflection was set, the gun led the sight by that amount and the gun pointer actually traversed the piece. To facilitate this operation the traversing handwheel was brought nearer the gun pointer by extending the shaft about eight inches. The old vertical backlash had still to be contended with, however.

Communications consisted of the usual altimeter data line from B' to B"; a parallel line that, although available to the altimeters in an emergency, was normally used for transmitting the range spotter's report after each course; and a separate line for each element of data (three in all) from the R. A. Corrector to the four guns.

During the months preceding the target practice season the battery experienced the usual difficulties incident to unit training at its permanent station which were accentuated by a serious shortage of man power. This situation was remedied by the assignment of thirty new men to the organization just prior to departure for annual field maneuvers and target practice. The battery was further augmented about three weeks later by an additional thirty men. These, together with the original nucleus of about thirty experienced men, enabled the battery to enjoy a complete manning table for a time at least.

Many men had to be trained for key positions, such as gun pointers and observers, but as the associate training of the officers of two

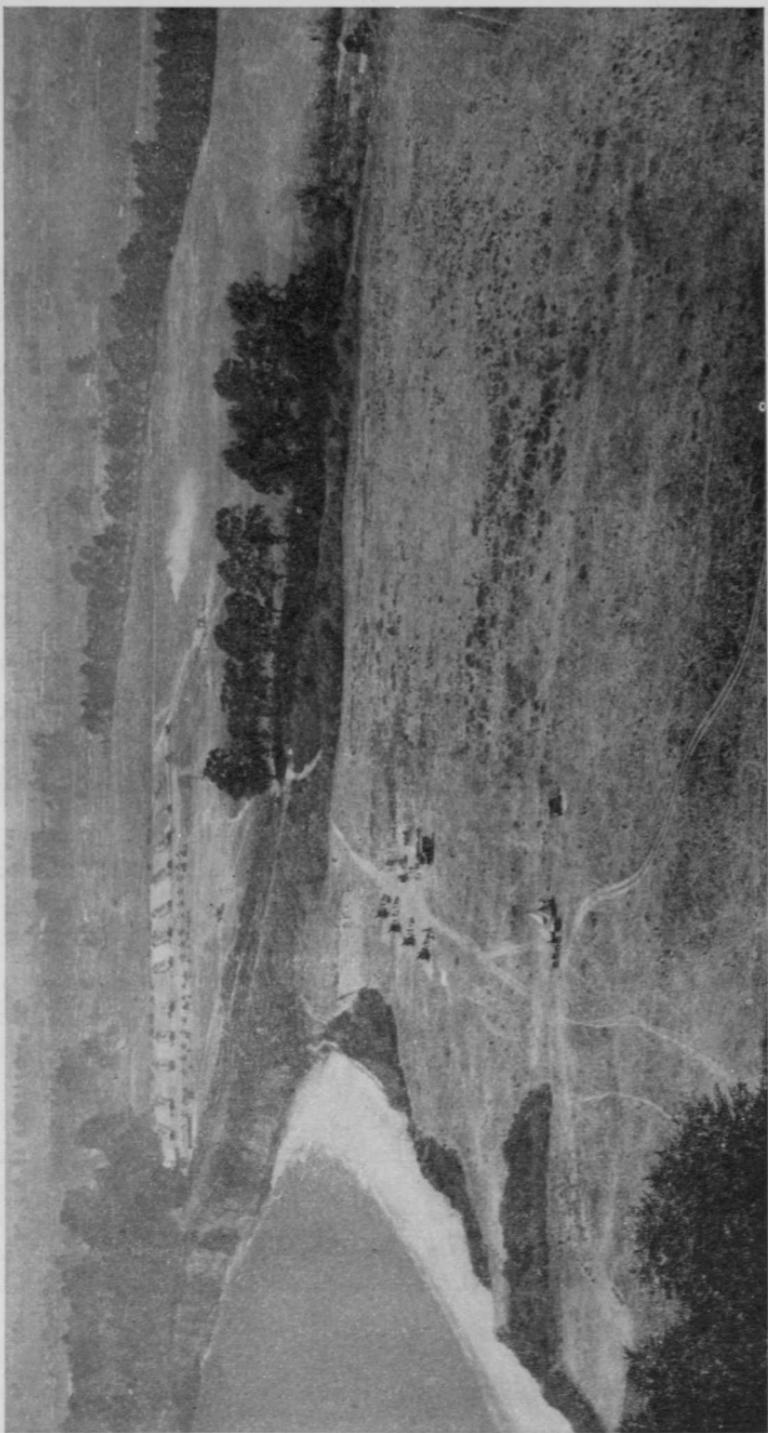


FIG. 1. AERIAL VIEW OF GUN POSITION

Reserve regiments had to be carried on simultaneously during the first four weeks of camp, the battery commander was able to dovetail these two classes of training very nicely.

Two DeHaviland planes with the necessary Air Corps personnel, attached to the regiment, furnished splendid cooperation throughout.

The preliminary training of the battery was progressive and consisted of calibration firings, wind, burst, and trial shot problems, and preliminary firings at towed target with one, two, and then four guns.

Experience had indicated that changing atmospheric temperatures affected burning of fuzes considerably. Therefore in order to obtain accurate calibration data the battery commander fired trial shots concurrently from the four guns. All gunners quadrants were tested and accurately adjusted for any errors before firing. Guns were fired in order from right to left, each piece firing as soon as the data from the

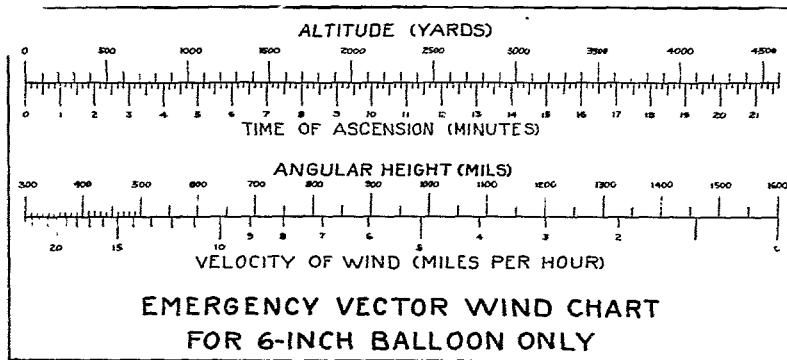


FIG. 2

preceding shot had been recorded. In this manner four trial shots were fired from all four guns in less than ten minutes elapsed time. Accuracy rather than speed was striven for however. Four sets of calibration firings were conducted during the preliminary training period so that the battery commander had ample data on which to base a standing correction on certain guns before going into record practice. All guns were carefully boresighted just prior to any firing. During the training of gun pointers frequent competitions were held between gun sections firing against time to speed up rate of fire.

No meteorological station being available in the field, wind data was obtained from an Emergency Vector Wind Chart which was designed by one of the officers of the regiment. Based on knowledge gained from his previous experiments in the ascensional rate of balloons he constructed a scale of altitudes in yards against time of ascension in minutes for the six-inch balloon inflated to twenty-four

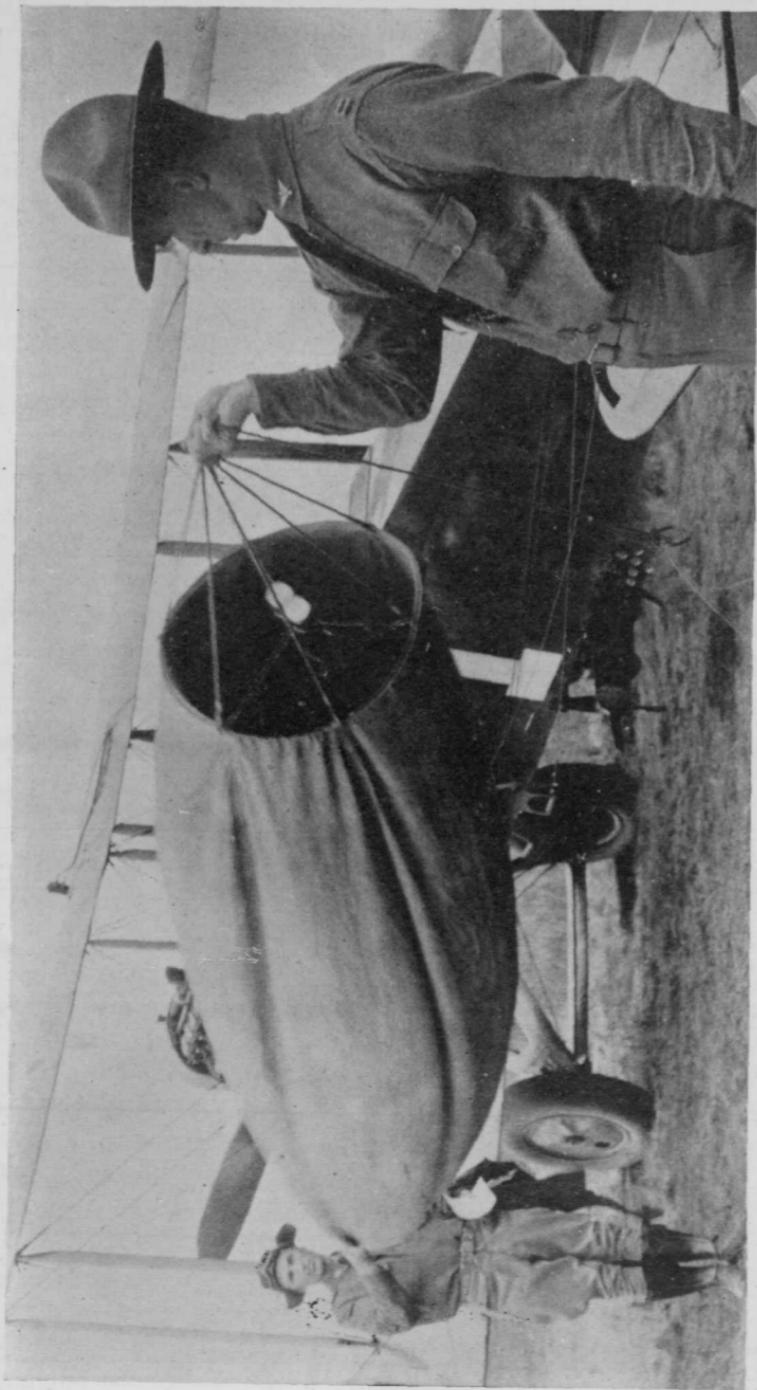


FIG. 3. WRING FLASHLIGHTS IN MOUTH OF SLEEVE TO AIM SEARCHLIGHTS IN PICKING IT UP QUICKLY

inches. Below this he constructed a scale of angular heights in mils against velocity of wind in miles per hour. The operation was as follows: Knowing the altitude at which wind data was desired the operator read from the first scale the time of ascension corresponding to that altitude. A balloon was then inflated to twenty-four inches, using a previously constructed wire hoop as a gauge, and released immediately above an oriented instrument, which in this case was the A. A. Telescope. At the end of the required time of observation the azimuth and angular height of the balloon were read and recorded. Opposite that angular height on the lower scale of the chart the operator then read the velocity of wind and converted the azimuth of balloon into azimuth from which the wind was blowing. The results obtained appeared to be sufficiently accurate as the mils effect on deflection checked very closely with that indicated by firing table values for such a wind.

The graphical solution recently recommended by the Coast Artillery Board (Project No. 415) was used both for calibration and for trial shots before firing at towed target. This method gave the battery commander an excellent picture of the results of his firing and was much more rapid than any solution previously suggested. The computation was speeded up by having prepared beforehand a table showing the products of various altitudes times the cotangents of various angular heights, in other words, horizontal ranges. Having measured the altitude and angular height to trial shot, the horizontal range was read from the table and the burst quickly plotted. Having also prepared, previous to firing, the desired section of the trajectory chart on an enlarged scale the battery commander was able to plot his trial shots, compute his corrections and have them set while the plane gained its altitude. He could then open fire as soon as the target appeared on the course, thus more nearly simulating service conditions.

During preliminary firing the regimental commander made frequent flights in a second plane to observe the results being obtained and on one occasion a Reserve battery commander fired a complete practice "on his own," meanwhile permitting the regular battery commander to observe the firing of his battery from the air.

Another unusual feature of the night firing was the illumination of the target by hand flashlights wired in the mouth of the sleeve, an idea which originated with one of the Air Corps officers. All who have witnessed night antiaircraft firings remember the hours wasted while searchlights endeavored to pick up the small sleeve trailing 1800 feet behind and several hundred feet below the towing plane. By pointing one flashlight back into the white sleeve, and two to the front, the target could be seen on clear nights at an altitude of 6800 feet. No

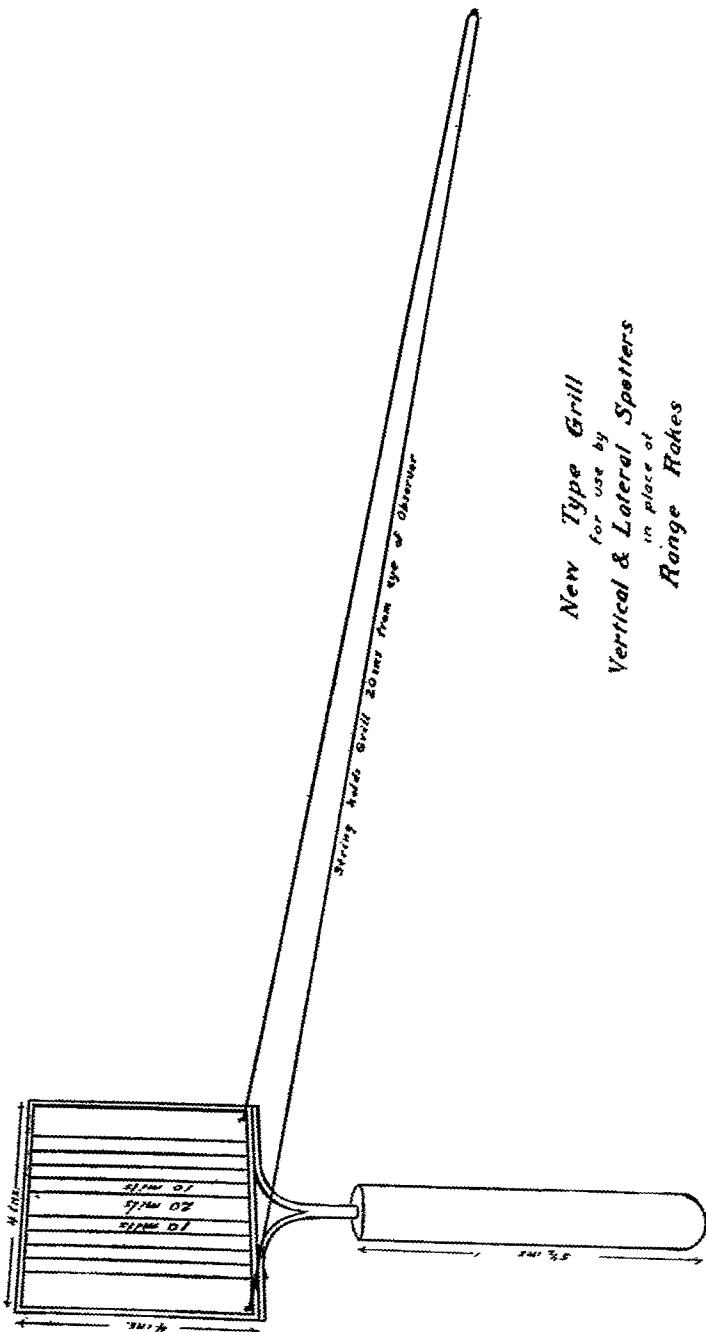


Fig. 4

time was lost picking it up after the turns and the time the plane was required to be in the air was certainly cut in half.

Anyone who has tried observing firing from the towing plane realizes the futility of attempting to observe accurately and record chronologically the deviations of all bursts during continuous fire from an antiaircraft battery of four guns. The battery commander therefore supplemented the data obtained from the plane observer by placing a range spotter near the B" altimeter station which was 3000 yards on the flank and somewhat in advance of the battery front. The regular spotters for determining the vertical and lateral deviations from the battery were located at the gun position, however, the familiar range rakes which frequently obscured some bursts were replaced by newly devised wire grills. When held 20 inches from the observer's eye the cross wires subtend an angle of 10 mils, except for the center 20-mil opening. The observers centered the target in this opening and held the cross wires vertically for lateral deviations and horizontally for vertical deviations. No bursts were obscured and quick accurate readings were obtained in their proper order.

By the conclusion of preliminary training the battery was functioning with machine like precision; each man knew his job and knew why he did it that way. For instance, the lateral deflection setters knew that in order for the gun to lend the target their deflection must be greater than 300 when target moved from left to right and vice versa, and they knew within about what limits to expect it.

On the date scheduled for night record practice the guns were bore-sighted late in the afternoon. Trial shots were fired just as it was growing dark and the towing plane took off at the same time. By the time it had reached its desired altitude all corrections were set, and the battery opened fire on the first course of the target and continued regularly thereafter as it alternated in direction until the end of the practice. No subsequent corrections were set during the firing.

A representative of a prominent weekly news reel company was present and took moving pictures of the firing which are now being widely shown.

The battery fired 77 rounds in 100 seconds firing time; secured 19 theoretical hits and 302 actual shrapnel holes in the target.

Said Major General Johnson Hagood last year, "There has been a good deal of discussion as to what should constitute a theoretical hit, but a hole through the target speaks for itself." The target for this practice turned out to be a "loud speaker."

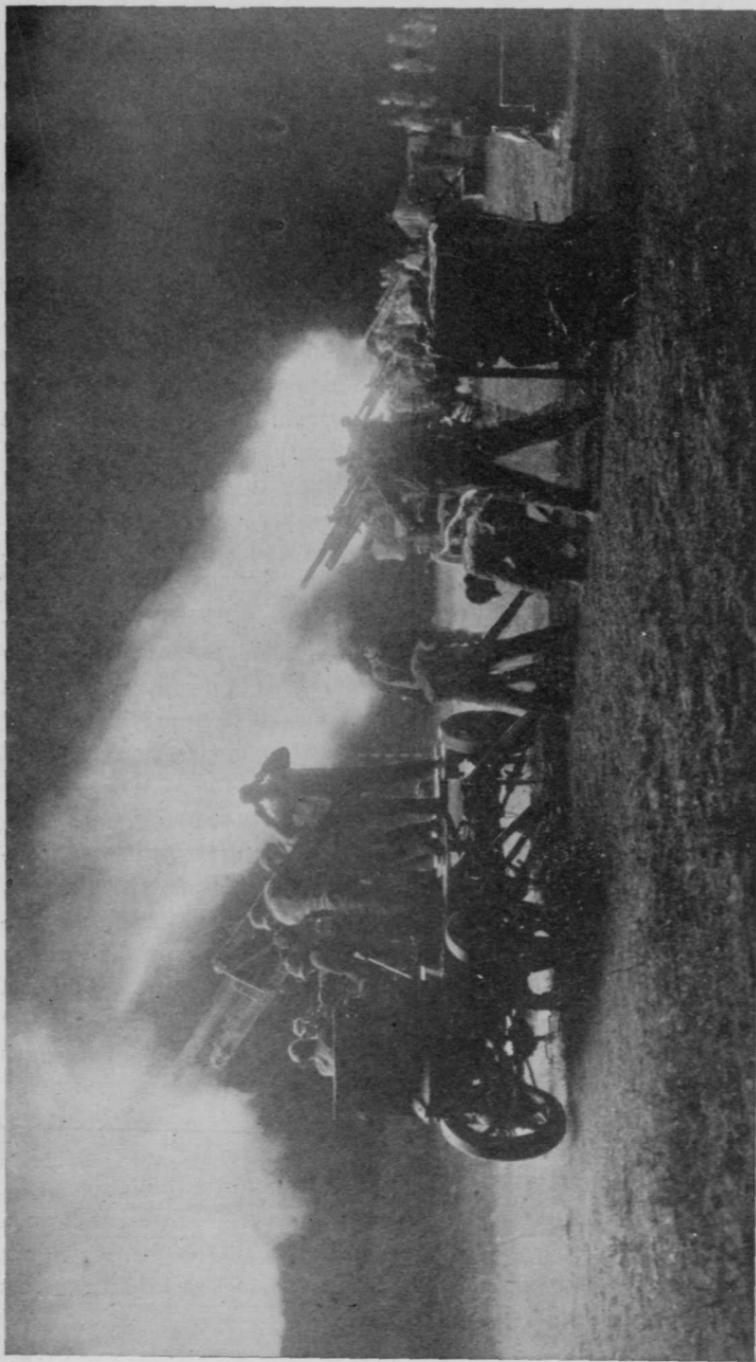


FIG. 5. THE BATTERY IN ACTION

Decisive Operation Prepared by the Allies for November 14, 1918

By RAOUL HOFF

Translated by CAPT. E. M. BENITEZ, C. A. C.

[Reprinted by courtesy of *L'Illustration*]

Translator's Note: The author of this article gives, from the French point of view, the expected results of the contemplated allied offensive in Lorraine, which was to commence on November 14, 1918. The operation as originally conceived was amended in view of the Allied successes, which were a sure indication of the weakness of the German forces.

Napoleon has said that "morale is to material as three is to one," and the low morale of the Germans just prior to November 11 greatly influenced Marshal Foch in speeding the Lorraine offensive.

There is no doubt that this operation would have been a grand success for the Allies. The German Armies would probably have been compelled to capitulate; and in order to avoid this humiliation, Germany wisely entrusted the peace negotiation to her plenipotentiaries. The place was well chosen after deliberate and careful consideration, and probably in no other portion of the front could better results have been achieved.

PROGRESSIVE SUPERIORITY OF THE ALLIED ARMIES OVER THE GERMAN ARMIES COMMENCING JULY 15, 1918

THE German armies obtained some undeniable successes on the Western Front from 21 March to 13 June, 1918. On two occasions, first on the Somme on March 21, and again on the Chemin des Dames on May 27, they solved the famous problem of the breakthrough, which, after the battle of Ypres, really dominated the entire war. The main German General Staff, however, either through indecision, or perhaps lacking in means of execution, did not exploit the initial advantages that it had obtained, and each time the Allies succeeded in reestablishing the situation which had been momentarily imperiled.

Commencing with July 15 there was a complete change in the situation, which even the most optimistic did not dare hope would be so rapid. The Allied armies resolutely taking the offensive, in turn, obtained an uninterrupted series of great victories that only the armistice interrupted.

The violence of our repeated attacks drove the German armies out of the defensive positions which they had very strongly organized and improved during four years; but realizing that the battle in the open would be distinctly unfavorable to them, they immediately sought to

stop in positions previously selected, but not organized, which nevertheless presented the advantage of shortening the front more and more.

LINES UPON WHICH TO FALL BACK

The German High Command had selected several lines upon which their armies could fall back. The principal ones were the following:

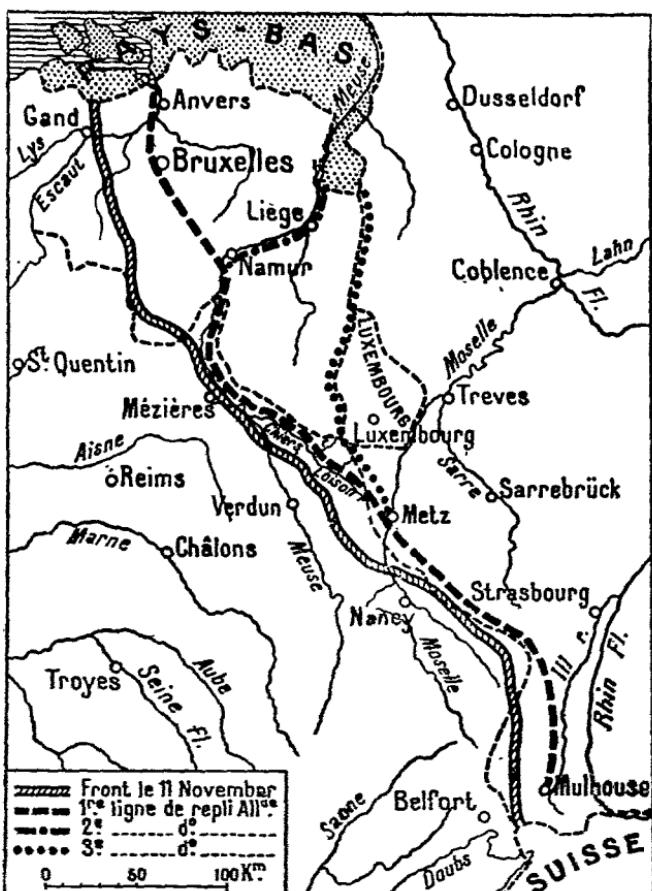


FIG. 1. LINES SELECTED BY THE GERMAN ARMIES UPON WHICH TO FALL BACK

1. A line Metz-Mézières—the Meuse and to the North, covering Brussels and Antwerp.
2. The line of the Meuse protected by two rivers—the Loison and the Meuse, which was forty kilometers shorter than the first.
3. A line covering the German frontier and the western frontier of Luxembourg, which was seventy kilometers shorter than the second line.

At the moment of the signing of the armistice, the line assigned to the German armies to fall back upon passed by Antwerp, Brussels, Namur, Thionville, Metz, and Mulhouse; but the first stage fixed for this movement—the course of the Meuse from Mézières to Namur and on to the Brussels-Antwerp line, had not been reached by November 10.

This line—the last before the Rhine—did not lend itself to a strategic defensive. Over a large stretch the German right wing, having Holland behind it, had no way of retreat; the center offered an easy break; the line Thionville-Metz, after the loss of the St. Mihiel salient, found itself already enveloped; and finally, the southern part was entirely too close to the Rhine and could not be held with the necessary tenacity. The principal defect of this line was due, however, to the absence of *rocade** lines, which are so indispensable to the movements of armies.

ROCADE LINES OF THE GERMAN ARMIES

From the beginning of hostilities, the German Army had utilized to a great extent the highly developed system of railroad communications in the northeast of France, not only to transport their troops coming from the interior, but especially to effect the regrouping of forces as required by circumstances.

The five roads, called "rocade" lines because they ran parallel to the front, permitted the Germans to engage their general reserves on any point of the line of battle.

1. Vouziers—Asfeld—Laon—Guise.
2. Monthois—Amagne—Liart—Hirson—Marles—Laon.
3. Mommenheim—Sarrebourg—Bensdorf—Metz—Thionville—Longuyon—Mézières—Hirson—Berlaimont—le Quesnoy—Valenciennes—Orchies—Lille.
4. Sarreguemines—Thionville—Luxembourg—Arlon—Namur—Charleroi—Mons—Tournai or Namur—Brussels.
5. Mulhouse—Colmar—Strasbourg—Sarrebrück—Trèves—Coblentz—Bonn—Cologne—Aix la Chapelle—Verviers—Liège—Louvain—Brussels—Courtrai.

The possession of these railways, of which the Germans made intensive employment, gave them considerable superiority, and it was therefore essential that the Allies put them out of order at all costs. This plan was to a great extent realized on November 9.

In fact, on November 7, the First American Army, occupying Torcy, (a suburb of Sedan), cut off the railroad line Longuyon—Mézières; and on November 9, the Allied armies, by reaching Mézières, Hirson, and Maubeuge, rendered of no use the line of communication of the six

*Lateral lines of communication in rear of the battle front.

German armies (the IV, VI, XVII, II, XVIII, and VII) echeloned between the Dutch frontier and the Meuse. From that time on, the continuation of the battle became extremely difficult for our adversaries, who only possessed two rocade lines—the fourth and the fifth.

The fourth rocade line, passing through Brussels, Namur, Thionville, and Sarreguemines, although being about four hundred kilo-

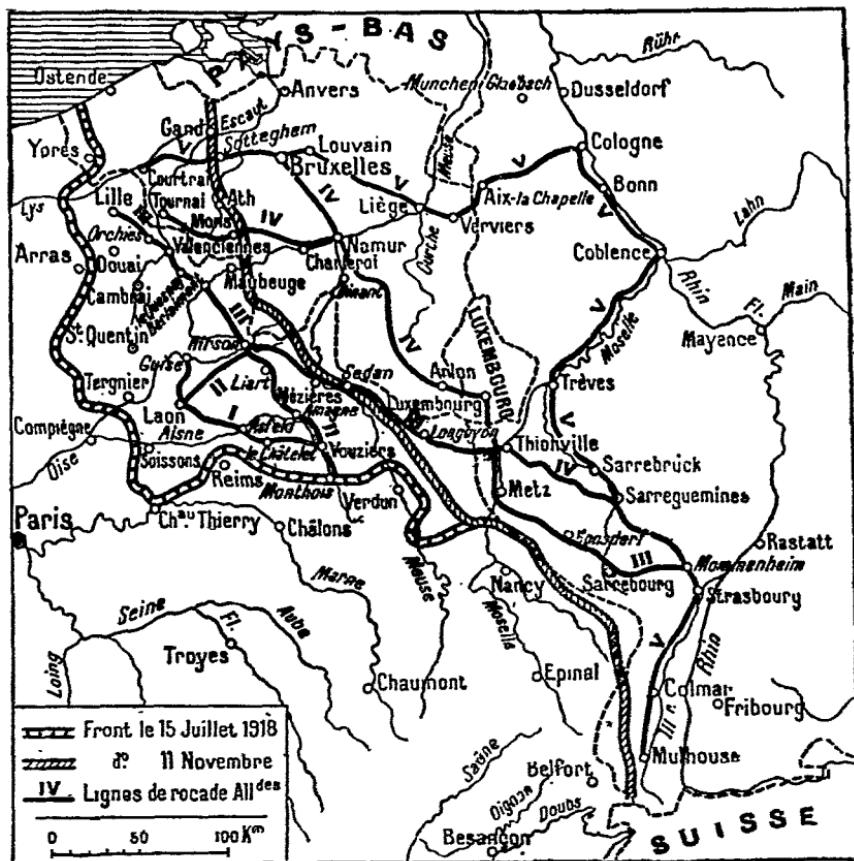


FIG. 2. ROCADE LINES LOST BY THE GERMAN ARMIES FROM JULY 15 TO NOVEMBER 11, AND THE ROCADE LINES STILL HELD BY THEM AT THE DATE OF THE ARMISTICE

meters in length, was still relatively short, while the fifth rocade line followed a course of more than seven hundred kilometers. The movements of troops by rail could, therefore, be executed only with extreme slowness. Under these conditions, even supposing that the Germans might still have been able to dispose of important reserves, the lack of sufficient means of communication rendered them henceforth utilizable only with difficulty.

THE CRISIS IN GERMAN EFFECTIVES

The successive retreats, as has already been indicated, had shortened the front of the German armies from nine hundred kilometers on July 15 to seven hundred kilometers on November 11, but their losses had been so heavy that their total number of divisions had decreased during the same period from 207 to 184. The Germans had been compelled not only to break up these twenty-three divisions, but they had also made considerable reductions of effectives in the greater part of their regiments. Nevertheless, as it was necessary to leave in line a certain density of troops, the number of German divisions went on increasing, as follows:

- On September 24, the front was held by 129 divisions (15 of which extended from the Moselle to Switzerland).
- On October 14, the front was held by 164 divisions (16 of which extended from the Moselle to Switzerland).
- On October 28, the front was held by 165 divisions (17 of which extended from the Moselle to Switzerland).
- On November 10, the front was held by 167 divisions (16 of which extended from the Moselle to Switzerland).

As a consequence, the number of divisions of the mass of maneuver diminished from day to day, and on November 11 the last German reserves comprised not more than 17 divisions, of which two only had more than one month of rest.

UNITS OF THE GERMAN ARMY AVAILABLE FOR SERVICE

Dates	Total No. of Divisions	No. Reserve Divisions	Value of Reserve Divisions		
			Fresh	Reorganized	Tired
July 15	207	81	43	26	12
September 26	197	68	21	40	7
November 11	184	17	2	5	10

On the contrary, the effectives of the Allies increased regularly, thanks to the arrival of American reinforcements, and on November 1 the Allied armies had 1,485,000 infantry opposing 886,000 of the German Army.

COMPARISON OF THE INFANTRY FORCES FROM JULY 1 TO NOVEMBER 1, 1918

	Dates	Allies	Germans
July 1	.	1,556,000	1,412,000
August 1	.	1,672,000	1,395,000
September 1	.	1,682,000	1,339,000
October 1	.	1,594,000	1,223,000
November 1	.	1,485,000	885,000

Thus, as the struggle developed, the Allies acquired an ever-increasing superiority over the Germans. On October 3, Marshal von Hindenburg, generalissimo of the German armies, already foreseeing the catastrophe towards which Germany was speedily marching, suggested to Prince Max of Baden, then Chancellor of the German Empire, that an offer for immediate peace be made to the Entente. His uneasiness was expressed in the following terms:

Berlin, 3 October, 1918

To the Chancellor of the Empire:

The Supreme Command of the Army reiterates its demand formulated on Sunday, September 29, 1918, for an offer of immediate peace to our enemies.

As a consequence of the crumbling of the Macedonian Front, which has caused a diminution of reserves in the Western Front, and also in view of the impossibility in which we find ourselves of making good the very heavy losses which have been inflicted on us in the combats of these last days, there remains no longer any hope—as far as it is possible for a man to judge—of forcing the enemy to make peace.

The enemy, on his side, throws into the fight new reserves daily. Nevertheless, the German Army remains firm and victoriously has repulsed all attacks. The situation, however, becomes more critical day by day, and the High Command is forced to make decisions which may bring grave consequences.

Under these conditions, it is better to stop the fight, in order that the German people and its Allies may avoid useless losses. Each day lost costs us thousands of brave soldiers.

HINDENBURG,
Marshal.

On October 5, the Chancellor yielded, and through the Swiss Government as an intermediary, telegraphed President Wilson to convoke the belligerents to some peace negotiations on the basis of the Fourteen Points, and also to stop further effusion of blood by the negotiation of an armistice. Nevertheless, the War Party, still powerful with the German Government and with the General Staff, did not wish to yield to the evidence and did not believe that the cause was irremediably lost. It was manifestly seeking to gain time. The Allied High Command, on the other hand, realizing the rapid and irreparable deterioration of the German Army, put all the available means into action in order to hasten the favorable outcome of the strife.

THE PREPARATION FOR THE OFFENSIVE IN LORRAINE

On October 14, one hundred and fifty German divisions, out of one hundred and eighty-seven, were echeloned between the sea and the Meuse, that is, on that part of the front where the greatest activity had manifested itself. However, from Montmédy to the Swiss frontier, a

front of about 275 kilometers, only twenty-three divisions were engaged. But what rendered the situation particularly difficult in this sector was the fact that reinforcements could only be dispatched to this part of the front with extreme slowness, at a maximum rate of one division per day.

The Allied High Command concluded therefrom that the Group of Armies of the Duke of Würtemberg (XIX Army and Army Detachments A and B) would rapidly find itself in a critical situation in case of a formidable attack directed against it.

On September 7, the successes obtained from Rheims to Amiens by the Group of Armies of the Center and the Group of Armies of Reserve had led General Petain to inform General Castelnau, who commanded the Group of Armies of the East, of the necessity of revising the offensive plan on the Lorraine, because, in view of the favorable development of operations, it was of a capital interest that the Allies should be able to assume the offensive on the entire front as soon as circumstances demanded it.

The general offensive had commenced on September 26, and by October 14 the German defensive system had been completely broken up. The famous Hindenburg position, which constituted its skeleton, had been completely carried in the battle sector; and St. Gobain, one of the pillars of the Western Front, had fallen into the Allies' hands. From the sea to the Moselle, the Germans did not possess any more organized defensive positions; and from 14 to 19 October, the entire coast of Flanders, which constituted the support of the German's right, had been completely liberated.

The importance of these successes permitted General Petain to write to General Castelnau, on October 19, the following:

Due to the considerable superiority which we have acquired over our enemy in the present battle, we can and should, on those parts of the front that are still stabilized, be prepared to pass to the attack without any other preparations than those necessary to the rapid and secret emplacement of the supplementary means of action—munitions and artillery, large units, and air service.

The Group of Armies of the East, having only played a passive rôle from the beginning of the Allied offensive, did not possess sufficient means with which favorably to undertake an action of great radius. Its two organic armies—the Eighth and the Seventh—comprised only a small number of divisions that it was indispensable immediately to reinforce. The concentration of the new units, necessary to this Group of Armies in order to carry out the rôle which had been assigned to it in the prospective battle, commenced on October 15.

As we shall see later, in order to facilitate the exercise of command, the staff of the Tenth Army had been placed between the Eighth Army and the Second American Army.

**OPERATION OF THE BREAK-THROUGH STUDIED BY
GENERAL DE CASTELNAU**

An offensive of the importance of that which was projected demanded a minute preparation. In order that nothing should be left to chance, General de Castelnau, after having studied it in its smallest details, forwarded on October 23 these considerations to General Pétain:

Headquarters, October 23, 1918.

GROUP OF ARMIES OF THE EAST

General Staff—3d Bureau
No. 1753

Typewritten by an Officer.

**THE GENERAL OF DIVISION DE
CURIERES DE CASTELNAU**

Commanding the Group of
Armies of the East

TO THE COMMANDER-IN-CHIEF:

You have sent me under date of October 19, under No. 27,489, instructions relative to the operation that will eventually be undertaken in Lorraine. I have given the necessary orders to the Eighth Army.

I believe it to be my duty to submit to you, apropos to the projected offensive, certain considerations as set forth in the accompanying notes.

CASTELNAU.

G. A. E.

23 October, 1918.

Notes on the Operation in Lorraine

Aim of the Operation.—To break the enemy front; to assure our entrance into the open country to the north of the forests of Bride and Koeking and of Château-Salins. This result will be attained by the occupation of the heights of Baroville-Morhange. Also to begin the encirclement of Metz on the right bank of the Moselle and to push later on in the direction of the Sarre.

The depth of the advance to be realized is about twenty kilometers.

Front of Attack.—The front of attack is limited on the left by the advanced defenses of the fortified city of Metz, and on the right by the region lying just this side of the Vosges. Its development must conform to the means at our disposal (twenty Infantry Divisions).

It should be considered that, on the right, the assailant must be interested in protecting himself by the region of the Marshes, without, however, penetrating in them. This region is difficult of traversing; the liaison between the infantry and the artillery is poor; in fact, this terrain is not suitable for exploitation. But it will be necessary to hold the outlets of the region of the Marshes, in occupying the heights of the Juzelle-Donnelay-Château de Marimont, and also to join the front reached with the old front in those parts in which it will remain stabilized. With this end in view, it will be necessary to capture the region south of Sanon, Remabois,

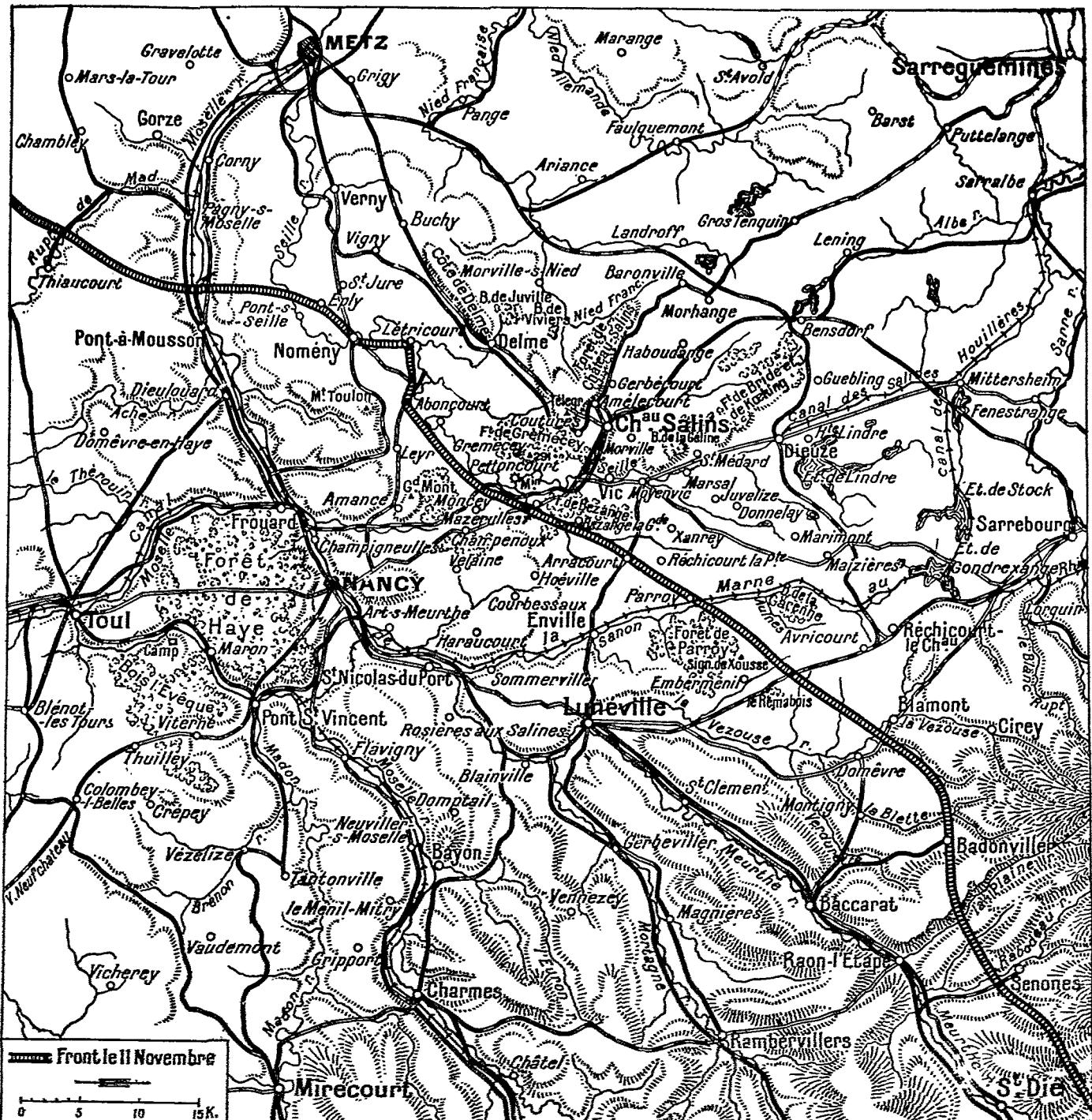


FIG. 3. TERRAIN OF OPERATIONS FOR THE OFFENSIVE OF NOVEMBER 11 IN LORRAINE

the Signal de Zeusses and the heights which border the little brook of Aulnes.

These considerations determine the right of the attack.

The left must necessarily comprise the Côte de Delme, which is to be maneuvered at the same time from the north and from the south. The distance from Pont-sur-Seille, the Franco-American boundary, to the station of Embermenil is, taking into account all the sinuosities of the front, fifty-two kilometers, of which eleven kilometers, it is true, correspond to objectives very close to the front line of departure. It may be seen, therefore, that this front of attack is too extended for the means available.

The front from Pont-sur-Seille to Létricourt is, besides, oriented southwest, while, starting at Létricourt, it bends sharply towards the southeast. Finally, to the west of Létricourt, the left of the attack will have especially a mission of flanking and of covering, a mission which will be equally incumbent on the troops holding the sector between the Moselle and Pont-sur-Seille. From this, it is apparent that it would prove advantageous to confide to the Second American Army, which is extended to Létricourt, the mission of flank guard, which it would execute by attacking straight ahead in such way as to close up on Metz, attacking and outflanking the Côte de Delme on the north.

The front of attack of the twenty Infantry Divisions of the Eighth Army (from Létricourt to the Etang de Parroy) will thus be reduced to thirty kilometers, to which must be added the eleven kilometers separating this marsh from the station of Embermenil and corresponding to a close objective..

This operation deserves the assignment of the necessary means in order to assure its full success. The enemy, in fact, considers that Metz and the Lorraine front constitute the left pillar of his dispositions, and we must seek to shake that pillar and carry our troops into the open country, beyond the enemy organizations. The success of this operation will bring about happy consequences.

Successive Objectives.—Once beyond the forests of Bezange and Grèmecey, the central part of the attack will come in contact with the large forests of Château-Salins, Bride, and Koeking, which run along the direction of the attack. On the other hand, the second position passes by the Côte de Delme, southern edge of the forest of Château-Salins, the hill crest to the south of the woods of Géline, Juvelize, and Donnelay.

With these outstanding features as a basis, it is logical to take for successive objectives:

1. The outlets of the forests of Grèmecey and Bezange.

2. A line passing through Tincry, Gerbécourt, the narrowest part of the forest of Bride (the heights of St. Médard), and the heights of Juvelize and Donnelay.

3. Morville-sur-Nied, Baroville, Morhange, Guebling, and Lindre-Haute.

From the Etang de Lindre, the line will be adjusted to the old front by the Château of Marimont, the Woods of Garenne and le Remabois.

The last objective thus defined will then serve as a basis of departure for the exploitation towards the Sarre.

It is difficult, and even useless, to state the time that it will take to attain that objective, because it all depends upon the amount of resistance

offered by the enemy, on delays necessary in the reorganization of communications, time necessary for the change of position of the artillery, and on climatic conditions.

Composition of the Large Units.—This will be determined by the Army in accordance with the facilities for debouching and progressing. The Army will also have to take into account the following conditions.

The axis of the contemplated operation is marked out in a general manner by the great highway Moncey—Château Salins—Baronville.

The terrain on the right of this axis is well adapted for a rapid penetration. In fact, from the highway above mentioned to the woods of Geline the terrain is not wooded, the woods of Geline being connected with the forest of Bride by a thinly wooded isthmus. To the north of this isthmus there are no large forests, and operations are carried out in an open country.

To the west of the highway, on the contrary, the massive forests of Grèmecey and Château-Salins are separated only by a passage of two and a half kilometers, which contains the great highway Metz—Strasbourg, and where the high eminence, the so-called "Télégraphe de Château-Salins," rises.

It is, therefore, in the terrain to the north of the base—the plateau of Réchicourt-la-Petite, Arracourt, Bezange-la-Grande—that the progress will be the easiest, and it is here where the destiny of the units will have to be fixed accordingly. Similarly, to the west of the forests of Grèmecey and Château-Salins, between Aboncourt and Létricourt, where the attack will be in open country, the density should be proportional to the facilities of progress.

Without entering into the details of the calculations of the front to be reserved for each one of the large units of the first line, it can be admitted that, as a first approximation, twelve divisions may be deployed from Létricourt to the marsh of Parroy, a distance of thirty kilometers.

The part of the front of attack comprised between le Remabois and the Sanon, while corresponding to a limited objective, presents, nevertheless, a serious importance at the beginning of the action. It is necessary, in fact, to possess the region of the Signal de Xousse in order to support the south wing of the attack which will be developed to the north of the Sanon, and also to paralyze the flanking action of the enemy forces that are in position in the woods of Garenne and the Château of Marimont. Two or three divisions will suffice for this action to the south of the Sanon, which should be considered as an indispensable annex of the principal operation.

There will remain six divisions to constitute the second line for the attack dispositions and for Army reserves.

Conclusion.—I estimate that twenty divisions will not be sufficient for the contemplated operation unless the Second American Army undertakes the attack to the west of Létricourt.

I believe that the great results that we seek at this hour in the development of the important operations in Lorraine justify the increase of the means to be employed.

CASTELNAU.

This project contemplated a break-through operation on a large front, which would bring about the encirclement of the fortress of Metz, permitting our advance on the Sarre. Besides the importance of the geographical objectives, the main object of this operation was to prevent the Germans from stopping on the Meuse, and to force their rapid retreat to the Rhine.

NOTE FROM MARSHAL FOCH TO GENERAL PETAINE

In order to realize this plan, Marshal Foch, as will be seen later on, had the intention of attacking the German armies to the west and to the east of the Moselle.

G. H. Q., 20 October, 1918.

OFFICE OF THE COMMANDER-IN-
CHIEF OF THE ALLIED ARMIES

Personal and Secret.

GENERAL STAFF
1st Section—3d Bureau
No. 4939

MARSHAL FOCH
Commander-in-Chief of the Allied Armies

To the COMMANDER-IN-CHIEF OF THE ARMIES
OF THE NORTH AND NORTHEAST

The operations now in progress aim at throwing back the enemy on the Meuse from Stenay downstream. In order to overthrow the resistance along this river by taking it on the reverse side, attacks must be prepared in two general directions—on the one hand, in the general direction Longwy-Luxembourg, and on the other, in the general direction of the Sarre.

These attacks will, moreover, have more chances of success in the beginning if they are started without delay, because the enemy has in line at this moment 127 infantry divisions to the west of the Meuse, and only 32 divisions to the east of that river.

They will, besides, have more chances of causing the enemy quickly to lose his main rocade line, Mézières-Sedan.

Consequently, it devolves upon us to dispatch those French units which may have become available, due to the narrowing of the front, to those places in the Lorraine front, to the east and west of the Moselle, where the equipment and nature of the terrain permit an immediate action, as well as to make a study of the participation that may take in these operations those American units that have or may become available due to our advance on the left bank of the Meuse which will permit the orientation of these forces in a new direction.

FOCH.

Nevertheless, Marshal Foch, taking into account the difficulties which the concentration of a mass capable of undertaking the offensive contemplated to the west of the Moselle would have entailed, decided indefinitely to postpone this operation; but on the other hand he decided to attack without delay to the east of that river.

It is, therefore, in that region, [writes the Marshal] that we must look forward to the application of those forces that are immediately available in an operation susceptible of attaining, with relatively small means, important results, as follows:

From the military point of view, by the conquest, at small cost, for all the depth of the defensive zone, organized by our enemies for four years, and by an exploitation as large as possible.

From the morale point of view, by planting the first step on a soil that the enemy considers as national territory, and that we must conquer.

THE DECIDED ATTACK TO THE EAST OF THE MOSELLE

In order rapidly to exploit the favorable situation brought about by the offensive of the Allied armies, General Pétain addressed, on October 27, the following instructions to General Castelnau:

Headquarters, 27 October, 1918.

**GENERAL HEADQUARTERS
OF THE ARMIES OF THE NORTH
AND NORTHEAST**

Personal and Secret. Instructions.

General Staff—3d Bureau
No. 38069.

To the GENERAL COMMANDING THE
GROUP OF ARMIES OF THE EAST.

I.—The offensives of the Allied armies between the Moselle and the sea have led the enemy to accumulate his troops on the present fronts of attack and to strip Lorraine of the reserves that he had maintained there until recent date.

II.—It is important to exploit this situation as soon as possible. It offers us a possibility of obtaining material and moral results, which may become even more important because the enemy will no longer be able to make use, after a short term, of his most advanced rocade railroad (Hirzon-Mézières), and will only be able, in consequence, to reinforce his Lorraine front very slowly.

III.—Consequently, the Group of Armies of the East is called upon to take the offensive between the region of Nomeny and the Rhine-Marne Canal, in the direction of the Sarre, at a date as near to November 15 as possible.

IV.—This offensive will be executed under the supreme direction of the General Commanding the Group of Armies of the East, by his two armies, namely:

The Eighth Army, already in sector.

The Tenth Army, which will be placed under the Group of the Armies of the East, and assigned to sector between the Eighth Army and the Second American Army.

The Second American Army will cover the left of this operation.

V.—The operation will comprise two phases:

1st: The break-through of the fortified enemy front, between Nomeny and Parroy, by means of two actions conducted on both sides of the forest of Grèmecey and directed as follows:

One on the Côte de Delme.

The other on the Marsal-Juvelize region.

2d: The immediate exploitation of this break-through by the two armies in the direction Morhange-Sarreguimines; combined with:

A lateral exploitation by the army of the right, which will come to support its flank on the region of the Marshes (Maizières-Dieuse.)

The organization by the army of the left, in liaison with the Second American Army, of a covering position facing Metz, between the Seille and the Nied.

VI.—On account of having at our disposal relatively limited effectives, although largely provided with tanks—counting on the effect of surprise—and attacking an enemy of mediocre quality, the offensive of the Group of Armies of the East should be conceived and directed, not as a *continuous assault* against a fortified line, but as a *maneuver*.

We must try to create large breaches among the hostile contingents, to engage them resolutely, and to overthrow by maneuver those positions at the front that have not been attacked directly but have been outflanked.

The army corps, therefore, have to push straight on their objectives. Surprise, maneuver, and vigor will constitute by themselves their best security and will assure their success.

VII.—The General Commanding the Group of Armies of the East will, in addition to the large units that are already in sector, receive the following units:

Headquarters for the Tenth Army.

Four non-divisional elements of Army Corps (of which two come from the Sixth Army).

About 20 divisions.

1 Cavalry Corps.

1 Air Service division.

3 Regiments of light tanks (includes the 508th).

2 Groups of medium tanks (one Schneider and one St. Chamond).

10 to 12 regiments of field artillery.

180 to 200 heavy artillery batteries.

A certain number (yet to be determined) of heavy, long-range artillery.

Subsequent orders will give the details of the conditions of arrival of these supplementary means, the concentration of which on the territory of the Group of Armies of the East will be progressive and will probably terminate between 10 and 15 November.

VIII.—GENERAL PRESCRIPTIONS. It is *essential* to achieve *surprise* and to preserve up to the last moment *the most absolute secrecy*.

a. The Command will, therefore, take the most rigorous measures to avoid divulging its projects and preparations.

It will not hesitate to orient those executing the operations with respect to eventualities contrary to the projects of the Command.

The face of the front will be maintained at least up to J minus two days (J is the day of the attack).

The reinforcing artillery, munitions, and materiel will be put in position as late as possible and should be camouflaged with the utmost care.

The grand units will be concentrated by night movements. Their halts will be concealed from aerial observation during the day and night, day traffic being strictly limited and lights forbidden at night.

The telephone will not be used before the day of the attack by units of the sector below the regiment. All telephone conversations by superior units will be strictly controlled, and must not in any way disclose the plans and intentions of the Command.

Trial and adjustment fire will be limited, and even omitted whenever possible.

b. The artillery preparation for the attack should be reduced to a minimum, and the hour of the attack must be calculated so that the gaps that may be produced in the last organized line may be before noon of J day. The delay prior to the approach must be as brief as possible.

c. Advantage must be taken of any gaps made, and the advance will take place during the night of J to J plus 1 day, so that the operations against the desired objectives may be carried out on the morning of J plus 1 day. It is indispensable that the troops detailed for the undertaking arrive fresh at the terrain, and in order to accomplish this, the necessary steps will be taken in order to transport and land these troops as close to the line as possible.

d. In the exploitation phase, the large units will take position in width and depth, but will aim, both in front and flanks, at the far distant objectives.

e. The accompanying artillery will be limited to that which can possibly be drawn and kept well supplied.

IX.—The Commanding General of the Group of Armies of the East will base his plan of operations upon the above given instructions and will submit the same without delay for the approval of the General in Chief.

From this moment, Colonel Pirrot, commanding the 3d assaulting brigade, will make the necessary reconnaissance incident to the employment of artillery on the entire front of attack.

After the plan has been agreed upon, the assault artillery regimental commanders may, upon request, be sent to make a detailed study of the terrain, wherein they will be called upon to action.

PETAIN.

The importance of the means anticipated by the Group of Armies of the East was sufficient to indicate that the French General Staff intended to engage in a battle in Lorraine, upon the result of which might depend the issue of the war.

THE BATTLE OF LORRAINE ANTICIPATED IN ALL ITS DETAILS

On October 30, General Castelnau issued, in turn, his orders to the Commanding General of the Eighth Army, but Marshal Foch did not approve either the principles of distribution or the missions and means between the two attacking armies (the Eighth and the Tenth).

On November 6, General Castelnau, after having received on November 5 new instructions from General Pétain, issued a second order to his army commanders.

* * * * *

As a result of this Field Order, the contemplated smashing of the front was expected to occur to the west of Château-Salins.

The immediate exploitation was entrusted mainly to the First Cavalry Corps, which, passing through the gap opened by the infantry, was to break into the enemy's rear in order to spread panic among the German columns.

In the meantime, an Anglo-French attack between Valenciennes and the Oise, executed simultaneously with the attack in Flanders, had precipitated the falling back of the XVII, II, and XVIII German Armies, and carried the Allied front to the east of Valenciennes, while Guise and Landrecies were falling into the Allies' hands.

The German retreat on the entire front commenced on the following day. They were running the risk of endangering all their forces in the execution of a movement of such magnitude. Consequently, Marshal Foch directed on November 5, that "the offensive in Lorraine must commence without delay, because the importance of the circumstances were worth more than the moment of the attack."

THE ORDERS ISSUED ON SATURDAY, THE NINTH, FOR THE OFFENSIVE OF THE FOURTEENTH

During this time, the German Government, after the continued evasions which had followed President Wilson's notes of October 8 and 14, finally became reconciled to the recognition of its defeat. On October 26, while the Commanders-in-Chief of the Allied armies were preparing, in a session held at Senlis, an outline of the most important demands which Germany would have to meet, Ludendorff had tendered his resignation and it had been accepted. On the following day, a dispatch was sent to President Wilson hurriedly requesting him to forward his terms. On November 6, Germany was asked to send her parliamentarians to the French lines, where Marshal Foch stood ready to receive them. They left Germany on the following day, while at the same time Wilhelm II abdicated. On November 8, in the now historic forest of Compiegne, Erzberger listened to the conditions of the Armistice, which he transmitted to his Government.

The supreme offensive of the Group of Armies of the East continued to be hurriedly prepared. On Saturday, November 9, that is to say, on the day that the Germans were informed of the Allied terms, Generals Pétain and Castelnau (the latter modifying his order of the sixth), decided to entrust the main operations to the Tenth Army and to launch the attack not later than the morning of November 14.

[The Field Order, giving in detail the units and artillery formations that were to participate in the battle, issued on November 9, is omitted.]

The Group of Armies of the East had in reserve the 53d and 87th Infantry divisions, which were to land in their zones from the twelfth to the fourteenth of November, and the 1st Cavalry Corps composed of the 1st, 3d, and 5th Cavalry divisions.

The American Army had the following six divisions available between the Moselle and Pont-sur-Seille: the 3d, 29th, 36th, 4th, and

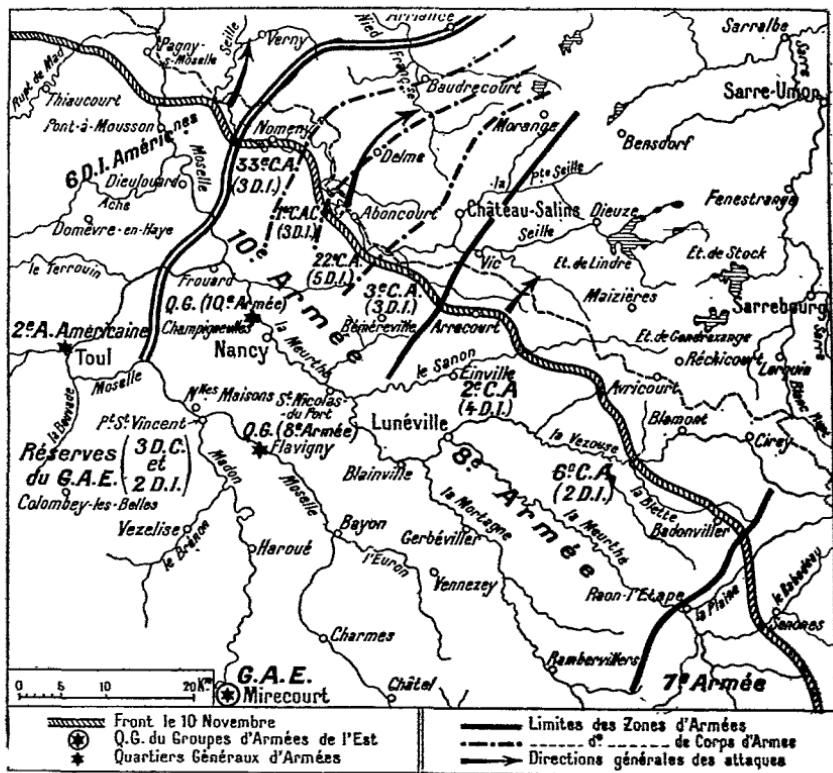


FIG. 4. GENERAL PLAN FOR THE BATTLE OF NOVEMBER 14, 1918

35th, and the 28th Division which the American command had withdrawn from the Thiaucourt front to effect the cover in front of Metz.

The Group of Armies of the East had available, therefore, between Pont-sur-Seille and Sanon, twenty-two divisions and a cavalry corps.

The Group of Armies of Würtemberg, with the exception of the right of Von Bothmer's Army (XIX) which had sustained on September 12 the American attack in front of Metz, had not yet felt the force of our offensive. It was only composed, however, of exhausted divisions that had been withdrawn after a short time of fighting and were not, therefore, capable of facing an important attack.

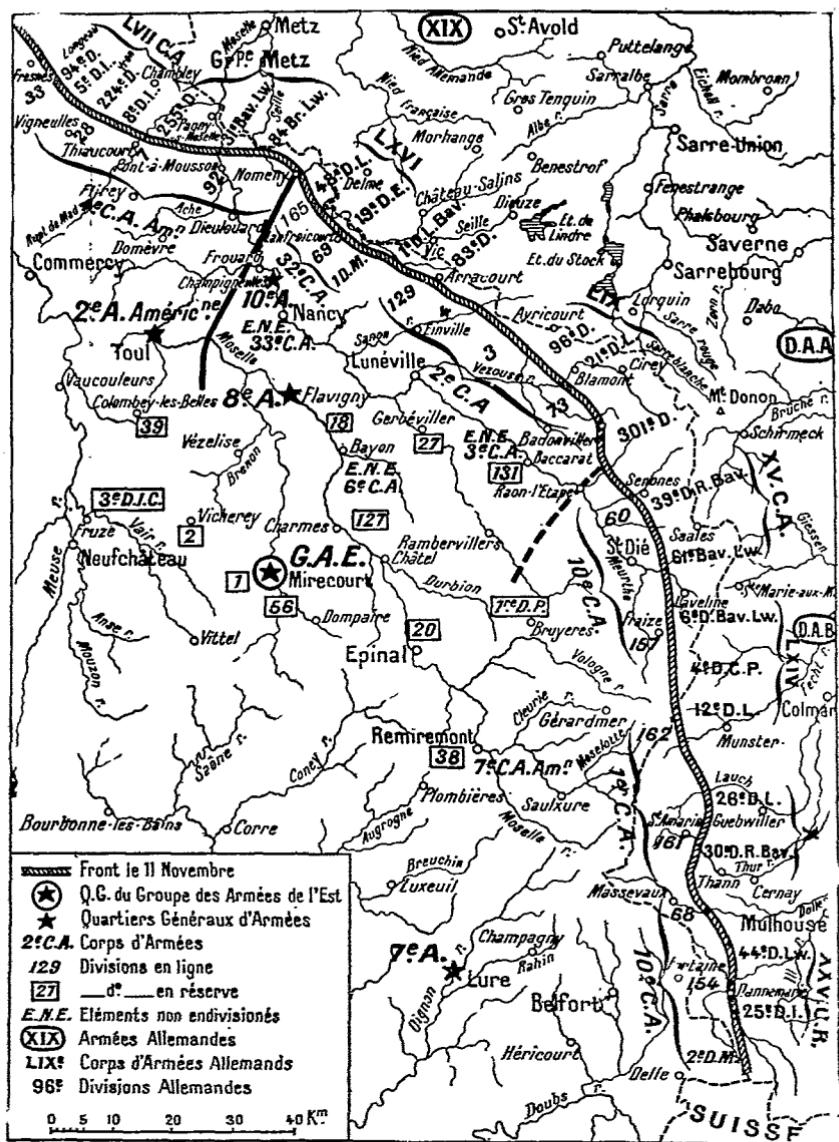


FIG. 5. POSITION OF ARMIES FOR THE BATTLE ON THE LORRAINE FRONT

The German G. H. Q. had knowledge of the contemplated Allied offensive, although it was ignorant of the sectors in which it was to take place, and, realizing the uselessness of any resistance, on November 11, removed the materiel of the fortress of Metz and moved back the troops in the Lorraine front. The order of battle of the Germans

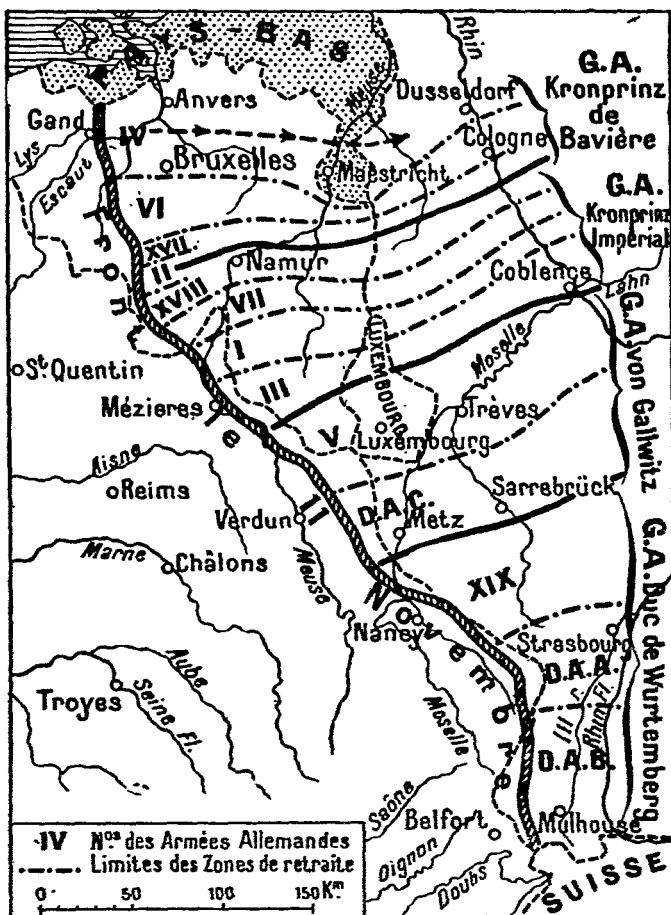


FIG. 6. RETREAT OF THE GERMAN ARMIES AFTER THE ARMISTICE

on the offensive sector, as given in the following table, comprised on November 11 only six divisions, three of which were landwehr. The enemy reaction would have been therefore insignificant.*

The offensive, so thoroughly prepared and to be undertaken with the most powerful means, was to be directed by one of our great mili-

*TRANSLATOR'S NOTE: The strength of the German and French divisions, at the date of the Armistice, was as follows: German: 481 officers, 10,096 enlisted men; French: 383 officers, 12,462 enlisted men.

tary leaders, General de Castelnau, the conquerer of the Grand-Couronne de Nancy, who, on February, 1916, had repaired a most desperate situation at Verdun, and whose knowledge of tactics was commensurate with a perfect knowledge in handling men.

GERMAN FORCES

	<i>Army</i>	<i>Army Corps</i>	<i>Divisions in 1st Line</i>	<i>Divisions in Reserves</i>
<i>Group of Armies of the Duke of Würtemberg</i>	XIX Army (Gen. von Bothmer)	LXVI	48th (landwehr) 19th (Ersatz)	None
		?	83d 1st (landwehr) Bav.	None
	Army Detachment ?	LIX	96th 21st (landwehr)	None

With the enthusiastic cooperation of the troops placed under his command, it may be truly said that there was no one better equipped than he to accomplish this most glorious mission of national salvation, the success of which would lead to the final breaking up of Germany.

Similarly, other offensive operations had been prepared in Flanders and in the center of the front to take place on November 14. These offensives were intended to accelerate the general retreat of the German armies.

DEFEAT AND UNAVOIDABLE ENCIRCLEMENT OF THE GERMAN FORCES

Our offensive in Lorraine, whose victorious results no one doubts, would have outflanked the German left, thereby directly threatening the lines of retreat of the bulk of the German forces.

A retreat of large units is, even for the best disciplined troops, a most delicate operation. These German troops, beaten for nearly four months, having suffered enormous losses in men and material,* completely demoralized, with no faith in success, were certainly in no condition to observe the necessary march discipline which was so essential to prevent a rout.

The Group of Armies of Von Gallwitz and of the Duke of Würtemberg were occupying a front with the least density of men, and in order to carry out their retreat, they would have had to break off the combat and regain the Rhine by maintaining a certain rate of march.

*The German losses from July 15 to November 11 were: 360,000 prisoners, 6615 guns, 38,768 machine guns, and 4989 minenwerfer.

In regard to the Group of Armies of the Imperial Crown Prince, we may say that two of his Armies—the VII and XVIII—which together comprised a total of forty-one divisions, would have met, on the contrary, serious difficulties. These two armies had to cross the Meuse on the narrow front of Fumay—Namur of about seventy kilometers extension.

The four Armies of the Group of Armies of the Crown Prince of Bavaria (II, XVI, VI, and IV), which together comprised sixty-eight divisions, could never have crossed the Meuse between Namur and Vise—a front of about seventy-five kilometers—due to the lack of roads and bridges necessary for the passing of such a large force.

To regain the interior of Germany, the six Armies had available between Fumay and Vise only three railways which were practically useless because they all met at Aix-la-Chapelle.

Finally, the IV and VII Armies, in order to avoid the salient formed by the Dutch Limbourg, would have had to follow a direction of march from west to southeast. This would have considerably narrowed the already insufficient zone of retreat of the XVII, II, XVIII, and VII Armies, and therefore paralyzed their movements.

It is easy to imagine the consequent bottling-up which would necessarily have taken place as a result of the hurried retreat forced by us upon our enemy. Events have offered ample proof that the Germans could not have broken off the combat without having left in our hands all their materiel and most of their units.

As a matter of fact, the German retreat to the Rhine, carried out in perfect ease, lasted nearly one month (November 11-December 5), and the VI German Army had to pass a large part of its forces across the Limbourg, in order not to obstruct the movements of the IV Army.

WHAT WOULD HAVE HAPPENED IF THE STRUGGLE HAD BEEN PROLONGED FIFTEEN DAYS?

Our offensive of November 14 would have made inevitable in this brief period the capitulation in open field of almost the entire German Army, and we have every reason to suppose that the latter would have been driven to the last extremity not later than November 25.

Our adversaries had to accept the conditions imposed at Rathondes in order to escape from an imminent and unparalleled disaster. This acceptance was transmitted by wireless on the tenth. The protocol of the Armistice was signed on the eleventh at 5:00 A. M., and at 11:00 A. M. it was put in force on the entire front.

We consented to the suspension of hostilities a few days before the brilliant triumph, which we had every reason to believe our arms would have attained.

It was natural that, after four years of superhuman struggles, the vision of peace, which the entire world desired, would influence all minds towards its speedy realization. And now that our territory had been almost completely evacuated, it seemed that the fighting should cease.

In Germany, however, where the humiliations and disasters caused by foreign invasion were never known, the legend, skillfully elaborated upon, of the invincibility of her armies was received very favorably, and the latter marched under triumphal arches in the cities through which they passed. It only took a few days for the German pride, which we thought had been humbled on the eleventh of November, proudly to come to life again, while we bitterly regretted our misunderstood generosity.

The laws of war demand the prolongation of the struggle only until the defeat of the enemy and do not permit the interference of sentimental questions, no matter how noble and humane they may be, when irreversible and supreme decisions are to be taken.

The Future, as supreme judge, will tell us whether or not we made a fatal mistake in having failed to apply this law rigorously and implacably.

We precipitously enter war without thought of cost, and then we proceed to figure expense without thought of war. We cannot expect to stand even partially ready for the sure maintenance of our ideals without paying for that readiness, and obligations demand that we stand ready. The glamour of the victory should not dull the recollection of its tremendous cost.—*Gen. John J. Pershing.*



COLONEL AND BREVET GENERAL JOHN C. TIDBALL
Commandant Artillery School November 5, 1883-November 5, 1888

EDITORIAL

Correspondence Courses in Troop Schools

SINCE its organization the Department of Correspondence Courses at the Coast Artillery School has been engaged in the preparation of text material, assignment sheets, and other matter required in the conduct of the courses of instruction offered by that department. The work now nears completion and the department is in a position to offer to the officers eligible for enrollment a series of thoroughly digested and well prepared subcourses, each complete in itself and each requiring thirty-five hours or less of the student's time.

According to Army Regulations, the correspondence courses are intended primarily to provide instruction for members of the Organized Reserves and the National Guard but are open to officers of the Regular Army on detached duty of a nature such as to preclude their receiving instruction through other agencies. To such officers these courses will be of immense value, but their use should be extended to make them available to other officers of the Regular services, particularly those pursuing courses of instruction in troop schools.

Troop schools are established by corps area, post, camp, and unit commanders for the purpose, so far as the officers are concerned, of insuring uniformity and coordination of training throughout the command, of providing the basic course for commissioned officers, and of providing general military educational courses for officers on duty with troops. These purposes can be accomplished to better effect, with less local overhead and with a greater degree of standardization, through the use of the material furnished with the correspondence courses in all cases where the subject matter of these courses coincides with that of the troop schools. For example, in the case of materiel not available at a post, the correspondence course, being complete in itself, will provide a suitable minimum of instruction with a maximum of facility. On the other hand, if the materiel be available, the correspondence course will be simplified and may easily be expanded to the extent permitted by local facilities.

It is not necessary, nor is it desirable, that such courses be conducted as correspondence courses. It would be sufficient to make the text and other matter available to the officers now charged with the

conduct of troop schools, with sufficient elasticity of program for expansion along any lines permitted by local facilities. With such an arrangement, general standardization of instruction would be possible and the conduct of troop schools simplified. It would appear that corps area, post, camp, and unit commanders err in not creating a demand for the instructional matter of the correspondence courses.

To weep and gnash our teeth over preparations for war, because they cost so much, is but a symptom of decadence. "How can we afford these ships or these armies?" This is the whine of a small householder and not the cry of a virile nation. Neolithic man wept similar tears, no doubt, over his arrow-heads. "How can I afford all these days chipping this wretched flint, my body aches for food and my brood is starving?" He did afford these days, and had he not done so, his race would have been exterminated. Nature cares nothing for the sweat of man's brow or the leanness of his purse; nations must, therefore, not only afford to survive but must *will* to do so. If some war commodity be beyond the national means or the national powers of labor, nations must not cease in their efforts or rely on second-rate weapons, but, instead, they must either increase their powers of labor or substitute for these costly weapons cheaper and more effective ones. The nations which can accomplish this survive; those which cannot—perish.—*J. F. C. Fuller, The Reformation of War.*

PROFESSIONAL NOTES

A Spotting System

By LIEUTENANT COLONEL HENRY W. OWEN, JR.
240th Coast Artillery (H.D.)

A spotting system devised by the writer, which was used with very satisfactory results at the 1926 target practice of the 240th Coast Artillery (Harbor Defense) (1st Maine), may be of interest to readers of the JOURNAL. Rapidity of operation and universal applicability are the outstanding characteristics of the system. Only two special devices are required and these can be easily made by any master gunner. These are the spotting board and the angular-linear deviation converter.

The spotting board (Fig. 1) consists of a square piece of board on which are mounted concentrically an azimuth circle and three superimposed discs of which the two upper are transparent and the underneath one opaque. The azimuth circle is stationary and the discs freely moveable about a pivot at the center of the board.

On each of the transparent discs is drawn one diameter and parallel to this diameter a series of lines spaced at 10- or 20-yard intervals at the scale of the board. One end of the diametric line is terminated with an arrowhead projecting slightly beyond the circumference of the disc, to serve as an index for setting the disc in azimuth.

On the opaque disc are drawn two diameters at right angles, and parallel to one of these a series of lines spaced similarly to those on the transparent discs. The diameter which is perpendicular to this series of lines is terminated at one end with an arrowhead as an index.

A convenient size for the board is 22 inches square, with discs 20 inches in diameter. With a board of this size a scale of 100 yards to the inch is convenient, the ruled lines being spaced 10 yards apart. The board used by the 240th C. A. was 13½ inches square with 10-inch discs, the scale being 150 yards to the inch and the lines ruled at 20-yard intervals. The larger size, however, is recommended in consideration of increased accuracy of reading.

Each disc should be provided with a projecting tab to facilitate operation, and a distinctive color should be used in ruling each disc to make each set of rulings distinctive. Facility of reading will be gained by making every fifth line, reckoning from the center, heavier than the others. Only the hundred-yard lines need have their value noted in figures.

The center of the pivot is the target. The arrowheaded line on each disc is the line of sight to the target, that on one transparent disc from S' and the other from S", and that on opaque disc from the directing point of the battery.

The board can be satisfactorily operated by two men, each of whom wears a headset on the telephone line from one of the spotting stations and operates one of the transparent discs. One of them, the assistant operator, also keeps the opaque disc set in azimuth, and the other, the chief operator, locates the splash.

The opaque disc is the longitudinal deviation disc and is kept set to the azimuth of the setforward point as called by No. 1 of the plotting detachment.

The S' and S" discs are each set at the azimuth of the target from the corresponding spotting station as transmitted by the spotting observer either at regular intervals or when called for. When the splash occurs, each operator of the spotting board receives from the spotting observer on his line the deviation in yards right or left and marks the indicated line on the appropriate disc by simply holding the point of a pencil on it. The chief operator then reads from the longitudinal deviation disc, under the intersection of the two marked lines, the deviation in yards over or short of the target.

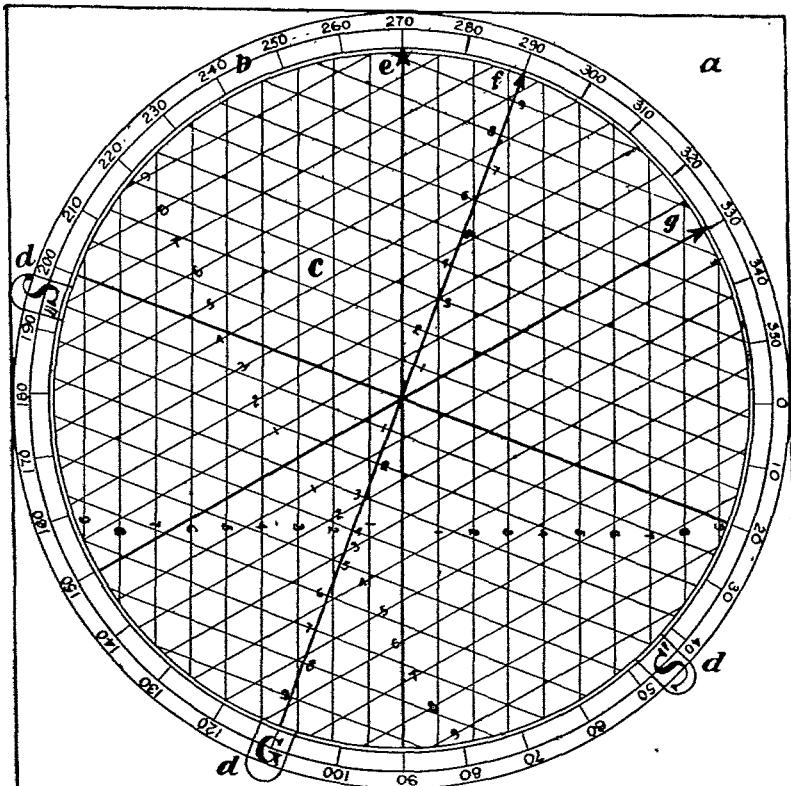


Fig. 1

The only special device, other than the spotting board just described, utilized in this system of spotting is the angular-linear deviation converter (Fig. 2). As the name implies, this instrument is used for conversion of the angular deviation of the splash as observed at each spotting station into yards "at the target." This simple problem may be done mentally, it is true, by use of the old rule of thumb that an angle of five one-hundredths of a degree is subtended by a linear yard for each thousand yards of range. Arithmetical solution of this problem, however, introduces liability to error, depending on the facility of the solver in mental arithmetic and a large liability to error in the result, whether right or left of the target. It is also the case that the tangent of .05 degree is not 1.00 but .87, which becomes important when either the range or the deviation is great. Using this instrument,

the spotting observer himself can make the conversion instantly and accurately without the least interference with his most important duty of measurement of the deviation. The spotting board operators are thereby left free to concentrate on accurate application of the simple data coming over the line from the spotting station.

The angular-linear deviation converter is simply a circular multiplying slide rule with special notation. It can be made of cardboard, thin metal, or any suitable material that may be available. It consists of two concentric logarithmic scales, the outer

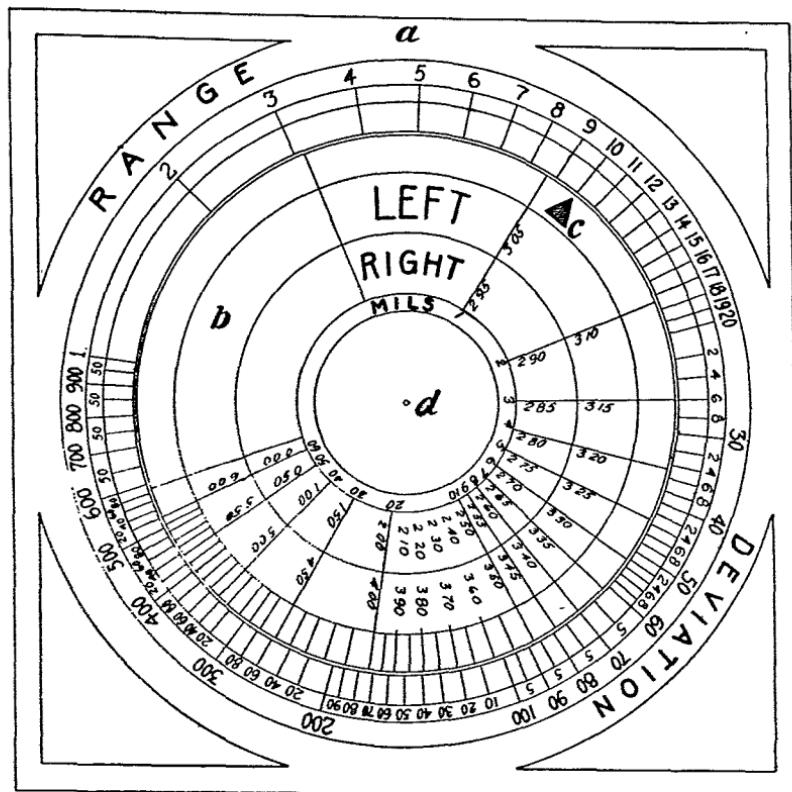


FIG. 2.

fixed and the inner moveable. The outer, or range-deviation scale (*a*, Fig. 2) extends through the entire circumference of the circle with notation from 1 to 1000. The graduations of the moveable interior, or angular deviation scale (*b*, Fig. 2), are identical with the exterior scale graduations from 1 to 60, but a special is substituted for the ordinary notation. There are three alternative notations for each graduation of the scale *b*. One series, marked "Left," starts with 3.05 and runs to 6.00 with .05 intervals. The second, marked "Right," starts with 2.95 and runs to 0.00 with .05 intervals. The third series is marked "Mils" and runs from 1 to 60. An index (*c*, Fig. 2) is placed to the right of the 3.05-2.95 graduation by the amount of the difference on the logarithmic scale between the logarithms of 1 to .87. The moveable scale is pivoted at *d*, Fig. 2. The scale *a* represents

both ranges, expressed in thousands of yards, and linear deviations, expressed in yards. The scale b is a scale of angular deviations, either as read on the interior scale of the azimuth instrument ("Left" and "Right" series of notations) or as obtained by azimuth difference ("Mils" series). The operator sets the index of scale b at the graduation on scale a representing the range from observer to target to the nearest thousand yards, and opposite the graduation of scale b representing the observed angular deviation, reads on scale a the equivalent in "yards at the target." In the figure, the index is set at 10 (10,000 yards). Suppose the angular deviation as read on the interior scale of the azimuth instrument was 4.50 (30 "points" left). Opposite the notation 4.50 on the scale b which appears in the series marked "Left," the operator reads on scale a , 260 yards left. If the angle-measuring instrument be graduated in mils, the operation is the same but the notations of the scale b marked mils are used and the 1-mil graduation is used as an index.

In the spotting system being described, each spotting observer is equipped with an azimuth instrument, model of 1910, or some other angle-measuring instrument and with an angular-linear deviation converter. He may be stationed at any convenient point where the necessary communication line to the spotting board can be provided. It is not necessary that the map location of the station be known, but data must be available for the orientation of his instrument. For the purpose, determination of the meridian within the accuracy of the magnetic compass corrected for declination and variation is quite sufficient. In the harbor defenses it is advantageous to place the spotters in the base end stations, or in one base end station and the primary station.

If located in or near a base end station containing a D. P. F. or a coincidence range-finder, the spotting observer can easily obtain the approximate range of the target (from his station) from such instrument. Otherwise he may obtain the range with sufficient accuracy from the angle subtended by the length of the target or, in target practice, of the towing vessel where such length is known or can be closely estimated.

Having oriented his instrument, the spotting observer keeps the spotting board operator informed of the azimuth of the target, and keeps the index of his angular-linear converter set at the nearest thousand yards of range from spotting station to target. When warned by the spotting board operator that a shot has been fired he keeps the vertical wire of his azimuth instrument accurately on the target, and on the occurrence of the splash runs the pointer over the deflection scale of the azimuth instrument to the edge of the splash nearest the target and reads the deflection scale. Glancing then at the angular-linear converter he reads the linear deviation and transmits to the spotting board "(so many) yards right (or left)." .

The spotting for the practices of all of the eight batteries of the 240th Coast Artillery was done this year by a detail of two junior officers and two enlisted men using this system. The two officers acted as spotting observers and were stationed near or in the base end stations of the battery firing. The two enlisted men operated the spotting board in the plotting room of the battery firing. The detail was made from regimental headquarters and the headquarters battery after arrival at camp. Neither observer had had any previous practice in observing splashes and none of the detail had had any previous practice in the operation of the instruments or the system. The communication lines required had to be improvised.

The eight practices were fired in the following order: Battery A, mortars; E, 12-inch guns; F, 10-inch guns; B, mortars, all on July 12; and on July 13, D, mortars; H, 12-inch guns; G, 10-inch guns; and C, mortars. This made it necessary for the spotting detail to move between each two practices. Only one spotting board was available, but there were enough azimuth instruments available for all of the spotting stations used. The moves were made without delaying the practices.

Notwithstanding the brief training of the detail, they lost only one of the 32 shots fired by the gun batteries at ranges varying from 9,200 to 10,500 yards, and for the 31 splashes spotted the mean difference between the spotters' report and the longitudinal deviations subsequently obtained by the plot of the splashes from the camera and lateral deviation records was only 27 yards. Thirteen, or 42 per cent, of these shots, were spotted within 12 yards, and 71 per cent were spotted within 30 yards. Airplane observation was available for seven of these shots, one of which was lost by the airplane. For the other six the results obtained by the terrestrial spotters and the airplane observer were practically identical, the former being somewhat closer and so much more rapid that the report had been received from the terrestrial spotting detail and the resulting correction made and applied before the airplane report was received. The airplane report was transmitted by radio to the radio station and thence relayed by telephone, the telephone wire being kept open.

The result in the case of the four mortar practices was not so satisfactory as to accuracy, probably on account of the special situation obtaining at the battery which was fired. The entire target course is hidden from this battery by a large island, on the left end of which the primary station is located. The observer of lateral deviations and the observer of the azimuth of the target at the instant of splash were both placed at the primary station on the island where one of the spotting observers was also located and an effort of the details for the three functions to cooperate seems to have worked badly. Under this arrangement, also, the lateral deviations on which, with the camera record, the plot of deviations is based, being observed at an angle of from forty to eighty degrees with the target course and most of the impacts being nearer the forty than the eighty degree end of the course, a slight error by the observer of lateral errors might make a large error in plotting the splash. Excessive armament errors developed tend to encourage the suspicion that all of the spotting errors show might not in fact have been spotting errors.

Be that as it may, the average spotting error shown for the mortar practices on the twelfth was 209 yards, and on the thirteenth, 60 yards, or a mean of 132 yards for the entire 30 mortar shots observed, two having been reported as lost.

The result obtained in the gun practices is believed to be the more reliable criterion of the system. Three errors of 30 yards in the spotting were directly due to a fault of the particular board used, the head of the pivot extending 30 yards from the center of the board and concealing the 20-yard line passing under it for a distance of approximately 60 yards. In each of the cases referred to a shot falling 20 yards short was reported ten yards over through the inability of the board operator's eye to carry the line through this area where it could not be actually seen. So large a head for the pivot was not necessary and this type of error also would be minimized with a larger board.

The result was obtained with a board having a scale of 160 yards to the inch and reading lines spaced 20 yards apart. With a scale of 100 yards to the

inch and lines placed at 10-yard intervals and with a pivot headed only sufficiently to hold the discs, it is believed that the mean spotting error can be reduced to ten yards at the ranges employed in this practice and with a well trained and practiced spotting detail.

The Seventh Coast Artillery (H. D.)

The Coat of Arms of the 7th Coast Artillery was approved by the War Department on July 20, 1924, and its blazonry is as follows:

Shield: Gules (red), a pile voided or (gold) crusily-fitchy of the like (gold) over all a Railway Gun in the act of firing argent (silver), flame proper (in natural color).

Crest: On a wreath of the colors (gold and red) a panther passant, gardant, incensed or (gold) flames proper (natural colors).

Motto: Nullius Pavet Occursum (He fears no encounter).

The 7th Regiment of Artillery was organized in 1898 and of the twelve batteries then included in the organization eight batteries constitute the present 7th Coast Artillery. Old Batteries C, M, and O are known today as Batteries F and B of the 3d Field Artillery, and Battery B, 5th Field Artillery. Old Battery N is now Battery A, 62d Coast Artillery. In 1901 the regiments of artillery were discontinued and the heavy and light batteries were designated as Coast and Light Artillery units, but continued as one branch of the Army, under the Chief of Artillery. In 1907 they were divided into Coast Artillery Corps and Field Artillery. The former were serially numbered in each fort where garrisoned in 1916 and again renumbered according to Coast Defenses in 1917. The system of designation of the companies in 1901 was again adopted by G.O. No. 21, W.D. 1922, and superceded by regimental designations in 1924. There are two units in the 7th Coast Artillery which have battle participation to their credit, namely, Headquarters Battery and Battery D. The former during the World War was Battery H, 53d Artillery, Coast Artillery Corps, and Battery E, 42d Artillery, Coast Artillery Corps, and is credited with firing the first hostile shot by American Railway Artillery in the War. This shot was fired from a 32-cm. French railroad gun at Somme Suppes on the Butte de Mesnil front. This battery was in the following operations: Champagne sector, 29 April to 14 July, 1918; Champagne-Marne defensive, 15 July to 18 July, 1918; Champagne sector, 18 July to 21 September, 1918. Battery H, 53d Artillery, received an army citation signed by General Petain, the Commanding General in Chief, and was awarded the French Croix de Guerre with palm, under Order No. 10,805 D, dated October 22, 1918, General Headquarters, French Armies of the North and Northeast, with the following citation, which was published in General Orders No. 11, War Department, March 27, 1924.

Aroused on July 14, 1918, when the camp was subjected to a violent bombardment of shrapnel and special shells, this battery went into action almost instantaneously under the orders of Captain Gardner and continued firing until its ammunition was expended. Under an uninterrupted bombardment, and in spite of serious losses in personnel, it never suspended firing for an instant.

Battery D, 7th Coast Artillery, received its baptism of fire at Royaumeix, near Commercy, and was at St. Mihiel and in the Meuse-Argonne operations. It was then a unit of the 53d Artillery, Coast Artillery Corps. The shield of the coat of arms is red for artillery. The history of Battery D is symbolized by the

pile (wedge) with the cross crosslets fitché which device was copied from the coat of arms of the 53d Artillery, Coast Artillery Corps, which took the cross crosslets fitché from the arms of Commercy. The French railway gun stands for the history of Headquarters Battery in France. The crest is taken from the coat of arms of the Coast Defenses of Sandy Hook where the 7th Coast Artillery was organized in 1924.

The change of designations of the units of this regiment is as follows:

Headquarters Battery: organized in 1898 as Battery H, 7th Regiment of Artillery; redesignated 78th Company, Coast Artillery, in 1901; became 2d Company, Fort Moultrie, S. C., in 1916; Battery H, 8th Provisional Regiment, Coast Artillery Corps, in 1917; Battery H, 53d Artillery, Coast Artillery Corps, in February, 1918; and Battery E, 42d Artillery, Coast Artillery Corps, in July, 1918; was given the additional number of 78th Company, Coast Artillery Corps, in 1922; and became Headquarters Battery, 7th Coast Artillery, in 1924.

Battery A, 7th Coast Artillery, was organized in 1898 as Battery A, 7th Regiment of Artillery; designated the 72d Company, Coast Artillery, in 1901; became the 1st Company, Fort Screvens, Ga., in 1916, and 1st Company, Coast Defenses of Savannah, in 1917; was again designated the 72d Company, Coast Artillery Corps, in 1922; and became Battery A, 7th Coast Artillery, in 1924.

Battery B, 7th Coast Artillery, was organized in 1898 as Battery B, 7th Regiment of Artillery; designated 73d Company, Coast Artillery, in 1901; changed to 6th Company, Fort Grant, C. Z., in 1916, and to 6th Company, Coast Defenses of Balboa, in 1917; was again designated the 73d Company, Coast Artillery Corps, in 1922; and became Battery B, 7th Coast Artillery, in 1924.

Battery C, 7th Coast Artillery, was organized in 1898 as Battery I, 7th Regiment of Artillery; designated 79th Company, Coast Artillery, in 1901; changed to 1st Company, Fort Michie, N. Y., in 1916, and to 23d Company, Coast Defenses of Long Island Sound, in 1917; became 18th Company—later 15th Company—Coast Defenses of Long Island Sound, in 1918; 6th Company, Coast Defenses of Long Island Sound, in 1919; again designated 79th Company, Coast Artillery Corps, in 1922; and became Battery C, 7th Coast Artillery, in 1924.

Battery D, 7th Coast Artillery, was organized in 1898 as Battery D, 7th Regiment of Artillery; designated 74th Company, Coast Artillery, in 1901; became the 4th Company, Fort Screvens, Ga., in 1916, and the 2d Company, Fort Screvens, Ga., in 1917; then Battery M, 8th Provisional Regiment, Coast Artillery Corps; Battery M, 53d Artillery, Coast Artillery Corps, in February, 1918, and Battery F, 53d Artillery, Coast Artillery Corps in July, 1918; received the designation, 74th Company, Coast Artillery Corps, in 1922; and became Battery D, 7th Coast Artillery, in 1924.

Battery E, 7th Coast Artillery, was organized in 1898 as Battery E, 7th Regiment of Artillery; designated 75th Company, Coast Artillery, in 1901; became the 2d Company, Fort Kamehameha, H. T., in 1916, and 2d Company, Coast Defenses of Pearl Harbor, in 1921; was again designated as the 75th Company, Coast Artillery Corps, in 1922; and became Battery E, 7th Coast Artillery, in 1924.

Battery F, 7th Coast Artillery, was organized in 1898 as Battery F, 7th Regiment of Artillery; designated 76th Company, Coast Artillery, in 1901; became 2d Company, Fort Hancock, N. J., in 1916, and 2d Company, Coast Defenses of Sandy Hook, in 1917; was again designated the 76th Company, Coast Artillery Corps, in 1922; and Battery F, 7th Coast Artillery, in 1924.

Battery G, 7th Coast Artillery, was organized in 1898 as Battery L, 7th Regiment of Artillery; designated 81st Company, Coast Artillery, in 1901; became

1st Company, Fort Grant, C. Z., in 1916, and 1st Company, Coast Defenses of Balboa in 1917; was again designated as the 81st Company, Coast Artillery Corps, in 1922; and Battery G, 7th Coast Artillery, in 1924.

The personnel of the organization wear the crest and motto in metal and enamel as a distinctive regimental badge on their uniform.

Fort Marion, Florida

By J. R. JOHNSTON

Situated as they were at St. Augustine, the oldest town of permanent European settlement on the North American continent, it was inevitable that Fort Marion and its predecessors should have an interesting history. Certainly the explorers, cavaliers, pirates and soldiers of fortune who invaded verdant Florida from time to time, lured by the siren songs of wealth and hope of glory, did their utmost to create events of an historical value. Some sought fabled fountains of youth; others came to pave the way for colonies or sack settlements already extant; while still others sought freedom from religious persecution in the wilderness of the New World.

It was necessary, of course, that the colonies be protected, and usually the building of fortresses kept pace with the construction of residences. The first fortification erected in the vicinity of St. Augustine was Fort Caroline established in 1564. This post was located at the mouth of the St. Johns River, and was garrisoned by the meagre forces of Rene de Laudonnière, leader of a group of French Huguenots who had been driven out of the mother country in the violent religious upheaval of the 16th Century.

Laudonnière's colony did not prosper, and in August, 1565, he was about to return to France when he was reinforced by Jean Ribaut and about 300 men. On the same day that Ribaut landed, a Spanish expedition sailed into the bay of St. Augustine, an expedition that boded ill for the French.

Immeasurably jealous of the nation that had stolen a march on him, the King of Spain had sent out a fleet of ships under Pedro Menendez de Aviles to exterminate the Huguenots, who added to the misfortune of not being Spaniards the mistake of not being Catholics.

Menendez had never been noted for his merciful activities, and he was determined to maintain his unsavory reputation at all costs; the cost, of course, to be the lives of the unsuspecting Protestants. So soon as he arrived at St. Augustine he reconnoitered the French colony and then proceeded to build a fort which he named San Juan de Pinos on the site of an Indian village.

Before a month had elapsed the cruel Spaniard surprised the sleeping garrison of Fort Caroline and killed one hundred and thirty men with little or no resistance. Ribaut's ships were wrecked soon afterward near Mantanzas Inlet and he and his men were induced to throw themselves on the mercies of Menendez, who promptly had them cut down in cold blood.

Both forts were now occupied by the Dons to secure their hold on Florida. Fort Caroline was rebuilt and rechristened Fort San Mateo but was foredoomed to disaster. In 1568 a band of vengeful Frenchmen under Dominique de Gourgues, enraged at the cruel murder of their countrymen, assaulted and captured the fort and hanged its garrison on the very spot where the Huguenots had been put to the sword.

Fort San Juan de Pinos stood for many years without strife. Then, one day, that bold English sailor and explorer, Sir Francis Drake, besieged it and cap-

tured it after a stubborn resistance. Both city and fortifications were almost destroyed, but were soon rebuilt. The fort stood secure until 1665, when St. Augustine was again attacked, this time by a force of buccaneers under Captain John Davis, and San Juan de Pinos was left a mass of ruins.

On the site of the old Spanish post rose a more substantial structure, which finally was to become Fort Marion. Work was continued for successive generations until in 1756 the stronghold was declared completed. The new fortress was named San Marco.

During all these years the fort was not without its battles and skirmishes. In 1702, again in 1719, and 1725, attacks on upper Florida were made by English forces from South Carolina and Georgia. In the first attack St. Augustine was burned to the ground, but for lack of artillery the invaders were unable to reduce the fort, though it was still incomplete.

An expedition which bore great promise of success was commanded by no less a personage than Governor James E. Oglethorpe of Georgia, who attacked the city in 1740. The incursion rose to the dignity of a siege, but reinforcements from Cuba drove the English away after several weeks of fighting.

In 1763, however, the staunch old warrior who had withstood many armed assaults fell before an attack of diplomacy, for it was ceded to England with the rest of Florida in exchange for Cuba, which had been wrested from Spain some time previous by force of arms. Fort San Marco in British hands became Fort St. Mark.

With the acquisition of Florida, England's colonies in America numbered fourteen. And because of the relief from the cruel rule of Spain, the first guns of freedom fired in 1775 awakened no response in the hearts of the people of Florida. To thirteen of the colonies the minutemen of Lexington and Concord and the heroes of Bunker Hill were patriots; to the fourteenth they were traitors.

Therefore the great peninsula became a haven for numerous Tory sympathizers from the north, many of them having the tar and feathers conferred upon them by the patriots still clinging to their skins. During this period Fort St. Mark was transformed into a depot for British operations against the southern "rebels." There were many incursions of loyalists into Georgia, which naturally called forth retaliatory expeditions. In 1778 two bodies of armed men marched from St. Augustine into Georgia. They succeeded in laying waste a part of the country but were driven back by 2000 Americans under General Robert Howe. This force attempted to destroy St. Augustine and its fortifications, but the project met failure.

Being far from the center of the fighting, old St. Augustine became also a prison depot, particularly after the fall of Charleston. Here the British prison ships brought their captives, and many prominent Americans were confined within the cold grey walls of Fort St. Mark during the latter half of the War of Independence.

Two years after the termination of hostilities, England returned Florida to Spain in exchange for Jamaica. It again changed hands after the War of 1812, for the first time becoming the property of the United States. And with the change, Fort St. Mark became Fort Marion, in honor of General Francis Marion—the "Swamp Fox"—of Revolutionary War fame.

Trouble with the Seminole Indians broke out in 1835, and hostilities raged until 1842, costing the United States two thousand lives and forty millions of dollars. During this period the regular army built and garrisoned ninety forts and military posts in Florida alone, and constructed 450 miles of highways.

Fort Marion was the center of the military operations on the part of the Americans, and was the scene of the disgraceful episode of treachery by which Osceola and other Indian chieftains were captured.

In 1838 General Hernandez, in command of the United States troops on the peninsula, sent word to Osceola that he would be safe from molestation should he come to Fort Marion for a peace talk. With every confidence in the honesty and integrity of the white men, the Indian leader arrived at the fort with seventy followers. He was immediately placed in irons, despite the promises given him and in violation of the customs of war. From Fort Marion the Seminole chief was taken to Fort Moultrie, in Charleston harbor, where he later died from much brooding and the unaccustomed confinement.

The same tactics were employed with Coacoochee, the second great leader of the Seminoles, and the war promptly collapsed. Coacoochee was confined in Fort Marion for a time, and then sent into virtual exile with his people to a western reservation.

During the Civil War, Fort Marion was the scene of a brief period of excitement when it was seized by sympathizers of the Confederacy. It quickly fell before Federal troops, however, and had no further active part in the conflict.

Fort Marion today is unoccupied by troops, its military value having long since passed. It still stands in the northern part of the city, however, and is a well preserved specimen of Spanish military architecture.

Inspection Trip by the Assistant Secretary of War

The Assistant Secretary of War, Colonel Hanford MacNider, has made the following report of his recent five thousand air-mile inspection trip through the Southwest, to the Secretary of War:

Upon my recent five thousand air-mile inspection trip to San Antonio and through the Southwest, the very apparent increase of interest by every Army post community and by the near-by larger centers in all matters of National Defense was emphasized at every stop. The close and cordial relationships built up between the Army personnel and the civilian population as exemplified on every hand in the field is a welcome story to those who sit on the receiving end of all the professional "Disband the Army" propagandists.

The Assistant Secretary's report, which covered conditions particularly in the Dayton, St. Louis, Fort Sill, and San Antonio districts, as well as the many large cities and air ports visited en route to over a dozen State Legion Conventions ranging from Vermont to Texas and from West Virginia to Iowa, relates not only an increased and intelligent interest in all Army matters, but a constant demand from civic organizations, as well as from former service men, for an increased scope in the many civilian training activities now a part of the War Department's program.

Without a single exception unsolicited praise of local Commanding Officers and the men of their commands was forthcoming in every state visited. The most frequent question put to me was: "How can we best help to secure better conditions for, and an increase in, the same kind of personnel for this particular community?"

In Texas, Oklahoma, Missouri, Iowa, North Carolina and New York, Army units, on the days of inspection, were found taking part in local celebrations, or public enterprises of one kind or another. In every city and

town visited, I was waited upon by public committees to express gratitude for the Army's helpfulness in community developments.

Despite the almost unbelievably bad housing conditions in many of the posts visited, the morale of the Army personnel was splendid. The Army's faith still appears to be in those whom they are striving to serve and it is sure there are better days ahead for the men who are still carrying on in uniform.

At the air fields inspected, there was a very apparent efficiency and businesslike activity on all current projects. The Air Corps personnel, as well as that of the Infantry, Cavalry and Artillery units visited, appeared to be all imbued with the firm conviction that they were building the best army in the world—with only the regret that their limited facilities did not allow a further extension of their service to the two other great elements of our land defense—the National Guard and the Organized Reserves.

Representatives of the National Guard and Organized Reserves were unanimous in expressing to me their high praise of the present War Department activities in their behalf. They commended highly the services of the officers and men of the regular establishment detailed for duty with these two components, or close enough to be of material assistance.

I noted that at every place where regular officers or enlisted men were on duty as instructors with the Guard, Reserves or in the schools, there were always delegations on hand to request a continuance beyond the regular assignment periods of these particular men. From this I drew the natural conclusion that our forces in the field are not only proving good soldiers but good citizens and assets to the communities in which they are stationed.

The Assistant Secretary, within the last year, has covered most of the posts where the 80,000 soldiers who are serving within the United States are stationed and his reactions to the situation are those from actual contact in the field, with officers and men of all ranks and with the organized groups of veterans which make up the 11,000 posts of the American Legion.

We have followed the policy of giving preference to former service men through business sense. We have found that men with army or navy experience make by far the best employees. A former soldier or sailor, who has been accustomed to preparing for weekly inspection in military service, need not be told of the value of promptness and attention to duty. . . . When it comes to a cheerful and efficient manner in operating our street cars we find that the former service man stands high above all.—*Francis M. Wilson.*

MILITARY NOTES

furnished by

THE MILITARY INTELLIGENCE DIVISION, G. S.

Great Britain

GUNNERY COMPETITION FOR TERRITORIAL ARTILLERY BRIGADES.—In order to promote interest and efficiency in gunnery in the Territorial Artillery, the King presents annually two cups which are competed for by Territorial Heavy Artillery organizations. The Prince of Wales also gives a prize to the winner of the competition between the field, pack, and medium artillery. All brigades of artillery carrying out annual battery practice may enter the competition. This year the competition for the King's Cup consisted of two series, each fired with a section of two 6-inch Mark VII guns. In the first series the firing was done at targets representing a battleship traveling at about 14 knots an hour at distances from 3500 to 5500 yards. The second series was fired at shorter ranges at smaller moving targets. In both competitions reduced charges were used. The result is decided according to both accuracy and time. Entrance for the competition is voluntary and if more than eight brigades enter teams, a preliminary competition is held and the eight highest entrants finally compete for the prize. The contest is conducted under the auspices of the National Artillery Association and this year was held on the Isle of Wight.

The King's prize consists of a silver cup for the winning brigade, and a silver medal for each enlisted man actually taking part in the competition. In addition to this prize, the following prizes are also awarded:

The Brooshooft Bequest of £30 (\$150) and the Drapers' Guild's prize of £21 (\$105) are given to the winning team, while the battery commander of this team receives a silver cup, presented by Elkington & Co. Second prizes of ten guineas (\$50), given by the Merchant Tailors' Guild and £25 (\$125), given by the late Mr. W. Morrison, are awarded, and the battery commander of the team winning second place also receives a silver cup. Twenty-five pounds (\$125) are also awarded the team winning third place.

Finland

THE CIVIC GUARD.—While in size the regular Finnish Army is small as compared with many of the other European States, the military power of the country can by no means be judged by the strength of the active peace-time forces.

Finland can boast of another branch of its national defense numerically much stronger and practically as efficient as the regular army. This sister branch is known as the *Skyddskar* or Civil Guard, which has a strength of 100,000 and which is administered by a commander-in-chief appointed by the President.

While service in the Finnish Army is compulsory for all males between the ages of seventeen and fifty-two years, service in the Civil Guard is voluntary, with more applicants for admission than there are places vacant.

The Guards are uniformed, armed and equipped, and all arms are represented except aviation and armored car units. In addition to infantry regiments, which

arm predominates in the Guard, there are three squadrons of cavalry, twenty-five 4-gun batteries of field artillery, and two detachments of tractor artillery. Eighteen of the field artillery batteries have 3-inch guns and the remainder 4-8-inch howitzers.

Units of the Guard are assembled several times a year for drill and exercises, usually for five or six days each in May and August, at which times training does not conflict with work on the farms. Each district, in addition, has winter training periods when units again go into camp or into the field for four or five days. All units assemble at least one evening each week in winter for lectures and theoretical instruction.

The expense of upkeep of the Guards is reduced to the minimum and they are limited to uniforms, rations during active training periods, and salaries of regular officers who may be attached. Service in the Guard is entirely voluntary, no payments being made.

A new school for the training of the Guard officers was recently inaugurated near Helsingfors where some ten officers of field rank are given a year's course in basic military subjects. During the summer this school also conducts thirty-day courses for junior officers and sixty-day courses for especially selected enlisted men.

An important branch of the Civil Guard is the *Lotta Svard*, or women's auxiliary corps, whose members attend each training camp in small detachments and act as nurses, clerks and cooks. The "Lottas" perform all kitchen police in the camps thus relieving the men from a great amount of field duty. It seems needless to state that the "Lottas" are an important element in keeping the morale of the Civil Guard at its present height.

CYCLIST BATTALIONS.—There are three cyclist battalions in the Finnish Army, each battalion approximating their war strength of one thousand men. The battalions are composed of three rifle companies and one machine-gun company of six guns. While the machine-gun cyclist companies are at present equipped with ordinary military bicycles, a project is being developed to equip them with motorcycles. During the winter months, these battalions are used as ski battalions. The Finnish ski differs from the Norwegian and Swiss type of ski in that the Finnish ski is not bound to the boot but is simply held on the foot by a loop through which the boot, which has a raised point, is thrust, thus permitting the ski to be discarded easily.

Japan

ANNUAL MANEUVERS FOR 1926.—The annual grand maneuvers of the Japanese Army were held in November in the Saga Prefecture on the Island of Kyushu, the most southern of the archipelago. The 6th and 12th Divisions, with several technical units of other divisions, took part in the exercises which featured the operations necessary for the maintenance of communications between Japan proper and Korea in time of war as well as the defense of Kyushu itself. General Prince Nashimoto commanded the offensive forces and General Shirakawa the defensive. The foreign military attachés were, as usual, invited to attend the maneuvers. The United States was represented by two officers.

In addition to the special grand maneuvers, several other large maneuvers were scheduled for the fall season. The largest of these was a division-versus-division problem in the Gifu Prefecture near Nagoya under the direction of Marshal Uehara where liaison with air and wireless liaison were especially tested. Special cavalry maneuvers were also held in the same area under the direction of the Inspector of Cavalry.

Russia

THE RED ARMY.—Recognizing that the poor education, both general and military, of the officers of all grades was causing a low state of efficiency in the army, and further that there were no trained officers available for an expanded army, the Government leaders determined to remedy these great defects. A system of military schools was started which has developed so that it now includes schools for company officers and higher commands, for specialists in general, for special branch training, for noncommissioned officers, and to provide reserve officers. It is estimated that approximately 75,000 men yearly take the one-year course in regimental noncommissioned officers schools.

Conscript graduates from the middle grade and higher civilian schools are placed in special detachments and trained as reserve officers. It is estimated that from 10,000 to 12,000 will be so trained yearly.

For several years prominent officials have advocated militarizing the civil schools. At the beginning of the present school year an advanced course in military training was introduced in all high schools and technical schools. It is divided into a theoretical course in war technique and a practical course of two months during the summer. All students who will be conscripts next year must take the course.

China

BATTLE LINES AT NANKOW PASS.—Study of the battlefield at Nankow Pass gives additional evidences of the needs for revising our old ideas of the efficiency of Chinese armies and indicates the remarkable advance in military science which some of the warring factions in China have made in the past few years.

It will be remembered that the Kuominchun or National Army of General Feng Yu-hsiang withdrew from the Peking area in April, 1926, and retreated to a strong position covering Nankow Pass, some fifty miles to the northwest. Here the National Army rested until August during which time they were able to concentrate on the building of a defensive position. On August 14 the combined forces of Marshals Wu and Chang attacked the position and captured the Pass.

Shortly after the retreat of the Kuominchun, at the invitation of General Chang Hsueh-liang, certain foreigners from Peking were invited to visit the scene of the fighting.

Writing of the battlefield, a foreign observer reports that, the National Army had an unusually elaborate trench system, well developed in all of its details but poorly sited, some of the trenches being on the skyline. The trench system consisted of well-reveted, traversed trenches, in front of which, on the enemy side, was the following:

A trench about six feet deep and six feet wide with sharp stakes one foot in height planted in the bottom;

A trench of the same dimensions with a high voltage live wire on stakes in the bottom and on the enemy side;

A high brush entanglement with heavy planks full of nails, points up, lying on the ground just in rear.

The attacking troops of the allied armies brought a heavy concentration of artillery to bear on the Kuominchun position under cover of which the infantry advanced and occupied the ground. General Chang stated that he had used four

regiments of 120 modern guns in the artillery bombardment and to cover the assault. Fragments of 3-inch trench mortar projectiles, 75-mm. shells, and 155-mm. howitzer shells were noted in the position, including high-explosive shells, which is unusual in Chinese warfare.

The details of this action seem to mark a definite advance in Chinese warfare as in previous engagements artillery firing has not been very effective due to extreme ranges and to lack of observation and adjustment. In addition Chinese troops have rarely shown any initiative in the type of fighting usually necessary to the storming of an entrenched position after an artillery preparation. In this particular engagement, although there was probably very little counter-battery firing and the ranges short against a very visible target, the results show an excellent concentration and adjustment of fire.

An army is a training school at least for the man, at least for the individual. If he makes good it is acknowledged; if he does not make good, he shows it. . . . For instance, anybody who is a corporal or an officer or has any degree, whether it be a high degree or only a corporal, has to have a little executive ability. He has to order men around, he has to make them do their task, he has to make this one and that one do this and that thing, and he has to instruct them to do it. It gives them a certain amount of efficiency and an opportunity to exercise it, which they otherwise would not get. There is no doubt about it, when employing a man who is a corporal as a foreman, you know that he can handle his men; he has to; he learns it there.—*Dr. Theodore Christian.*

COAST ARTILLERY BOARD NOTES

Communications relating to the development or improvement in methods or materiel for the Coast Artillery will be welcome from any member of the Corps or of the Service at large. These communications, with models or drawings of devices proposed, may be sent direct to the Coast Artillery Board, Fort Monroe, Virginia, and will receive careful consideration. R. S. ABERNETHY, Colonel, Coast Artillery Corps, President Coast Artillery Board.

Projects Initiated During the Month of October

Project No. 494, Sound Lag Computer.—Captain Albert M. Jackson, 62d Coast Artillery, has designed and constructed a sound lag computer to furnish continuous data, *i.e.*, apparent sound lag; predicted sound lag; predicted elevation; and the correction due to temperature refraction. This device is now under study by the Coast Artillery Board.

Project No. 495, Modification of Elevation and Correction Pointers on Antiaircraft Sights for Three-inch Antiaircraft Guns, Models 1917 and 1918.—A modification of the sight for 3-inch antiaircraft guns has been made at Frankford Arsenal and is being forwarded to the Coast Artillery Board for test.

Project No. 496, Antiaircraft Fire Control Telephone Unit as Installed at Aberdeen Proving Ground.—This is an assembly of the fire control telephone made up at the Signal Corps Laboratory in accordance with the recommendations made in Coast Artillery Board Project No. 371. The Coast Artillery Board has this unit under study and will submit recommendations to the Chief of Coast Artillery covering the suitability of the unit, together with any changes believed necessary to make it satisfactory.

Project No. 497, Test of Homelite Portable Charging Set and Ward Leonard Charging Panel for Sound Ranging Service.—This is a report of a test conducted by the First Sound Ranging Battery, referred to the Coast Artillery Board for remark and recommendation. The report is now under study by the Board.

Project No. 498, Predictor.—A predictor, claimed to be universal, and used by the 55th Coast Artillery in its recent service practice, has been referred to the Coast Artillery Board for test and recommendation.

Project No. 499, Program for Test of Long-Range Lewis D. P. F.—The Coast Artillery Board has been instructed to prepare and submit to the Chief of Coast Artillery a program for test of the new type Long-Range Lewis Depression Position Finder.

Project No. 500, Test of SCR-77-B (Short-Range Radio Receiving Set).—In accordance with recommendations made by the Coast Artillery Board in its Project No. 394 and subsequent correspondence, the Board has been furnished three SCR-77-B Radio Sets for test to determine whether they will meet the requirements for easily transportable, short-range radio telegraph sets for use with distant subposts of the antiaircraft information service that cannot conveniently be included in the telephone net.

BOOK REVIEWS

The Naval History of the World War—The United States in the War 1917-18. By Thomas G. Frothingham, Captain, U. S. R. Harvard University Press. 1926. 5½" x 8¼". 301 pp. \$3.75.

This is the third and final volume of Captain Frothingham's study, compiled from official sources, and even more readable than the earlier volumes. Indeed this reviewer—though in no suspense as to the happy ending—found it as stirring as a good adventure story.

Although there were no major naval engagements, the writer considers the naval operations during these two years to have been of great, even of paramount, importance, and it is just here that the reviewer finds provocation to quarrel with Captain Frothingham, who seems not always in full agreement with himself. For example:

At this time [the beginning of 1917] the influence of Sea Power had grown to be unmistakable, and it had become the outstanding factor in the World War.

It is hardly an exaggeration to say that the end of 1917 the whole war was being fought on the seas

It is a convincing and inspiring picture to look over the vast expanse of the World War and to realize that in the last stage Sea Power was the impelling force which was bringing final defeat to Germany.

But we must never forget that the final curtain had been rung down by the *decisive victory, on a military field of battle, gained by a military force* [reviewer's italics] which had obtained its military superiority by means of Sea Power.

It was the actual physical defeat of the German armies that brought about disaffection and revolution in Germany.

Captain Frothingham fails to see clearly at all times that the war had to be fought and won by land forces on the battlefields of Europe, that the operations of Sea Power in providing for safe transportation to France of troops and supplies, though essential to allied success, did not decide, but contributed, to the decision of the issue.

It should be recognized that the decisive factor in the war was the American Army, drawn into the war by the German government's illusive hope of winning by its Sea Power (the submarines). No one could indicate this more strikingly than has Captain Frothingham himself.

It was a strange stroke of fate for the Central Powers that this provocative means of warfare [unrestricted U-boat warfare] originally conceived in an unfavorable situation, was eventually to be carried out in a most favorable situation, when there were other means of victory [plainly a powerful military effort in France following the Italian defeat and Russian collapse] actually in the grasp of the Central Powers.

The preceding volume left off at the end of 1916 with the German Government committed to the attempt to gain victory by the unrestricted submarine campaign. In this, the writer takes up briefly the situation at the beginning of 1917, and points out the failure of either side to foresee the Russian collapse, the mistaken optimism of the Entente allies, and, not without exaggeration, the growth of the influence of Sea Power in the increasing effectiveness of the blockade of Germany, but concludes that—

. . . the German attempt to win the World War on the sea must not be considered as a last desperate resort, but as a carefully calculated effort to win by means which were thought to be infallible.

The Chapter headings that follow are—

The Entrance of the United States, The First Shock of the U-Boat Campaign, The Object of the United States in the World War, and The Adoption of the Convoy System.

There follows a brief but fairly detailed account of the performances of the German Raiders foot loose on the seas in 1917, and operating "not only without naval bases, but also without any service of supplies whatever," with the statement that they destroyed 272,000 tons of merchantmen and caused disabling damage to 3700 tons in addition.

Next are taken up the allied control of shipping, the strengthening of the blockade of Germany, and the increasingly successful operation of the convoy system.

In the chapter entitled "The Shifting Conditions of 1917" a striking picture is given. From the standpoint of Naval Warfare, some of the high lights are: the continuance of the British policy of always keeping the Grand Fleet devoted to the mission of defending against enemy attacks, the retention of the British light naval forces as a close screen for the Grand fleet and the failure to dispose them for anti-submarine warfare, the arrival and participation of the American destroyers, and the decision for and inception of the great North-Sea and lesser mine barrages.

The greater part of the subsequent chapters is necessarily a history of the general situation to which the naval operations were incidental, with more detailed accounts of the latter including the development and remarkable achievement of the American transport system, the laying of the Mine Barrage, the results of the U-boat campaign, and "the last minute plan for a desperate sortie of the Battle Fleet."

The writer's conclusions are interesting, though perhaps not fully demonstrated:

More than has been the case in other wars, did the military events of the World War depend upon naval strategy. Its military strategy and its naval strategy must never be thought of as things apart. Only by looking at the doubly braided strands can the true fabric be seen, and throughout the whole pattern the record of Sea Power is written indelibly. Here is the lesson of the far written sermon, for us never to let slip from our minds—the proof of the might and compelling force of Sea Power.

To the student of the history of the World War, who has not access to official sources, the series will be all but indispensable. The last volume is a contribution to the history of our country, which almost every educated American should own and enjoy.—R. S. A.

History of England. By George McCaulay Trevelyan. Longmans, Green and Co., New York. 1926. 5½" x 8½". 703 pp. Maps. \$4.25.

The author, in attempting to compress the two thousand or more years of English history into a single volume, entered upon a task of tremendous difficulty, but it must be admitted that he has succeeded extraordinarily well. He himself says, "A book that traverses so vast a field as the whole of English history in the course of seven hundred pages is apt to be either a text-book or an essay." Although presented in narrative form, the book is fundamentally an essay, in that it analyzes the social development of the nation in relation to economic conditions, political institutions, and overseas activities.

From the very beginning of the book the reader is impressed by the author's felicity in expression and by his wholly impersonal and impassionate attitude toward his subject—characteristics lacking in the works of the nineteenth century, but demanded of the historiographers of today. In this respect, while writing of the American revolution he is as American as our own writers of recent years. He finds both sides at fault, and concedes that America won because "led by a statesman of genius who was also a first class soldier, organizer and disciplinarian." In the end, he concludes:

It was well that America was made. It was tragic that the making could only be effected by a war with Britain. The parting was perhaps inevitable at some date and in some form, but the parting in anger, and still more the memory of that moment's anger fondly cherished by America as the starting point of her history, have had consequences that we rue to this day.

Mr. Trevelyan's book forms a delightful and discriminating guide for the student of English history. It is the best one-volume history of England yet written and undoubtedly will be accepted as a standard for a long time to come.

Aircraft Year Book, 1926. Aeronautical Chamber of Commerce, New York City. 1926. 6" x 8¾". 331 pp. Ill.

There is a distinct note of optimism in the 1926 Year Book.

At the time these words are written (early in 1926), it may be stated that much of the former reserve in the high commands of the Army and Navy has disappeared; positive and definite attention has been given by the Administration and Congress; and, finally, with the entrance of responsible men and substantial capital into air transport, the place of aviation in commerce and industry is now very generally recognized.

During the year 1925 aeronautics received considerable public attention. Military and Naval squabbles incident to the Shenandoah accident and the Mitchel trial aroused the public interest universally. Inquiries by Congressional and Administration committees furthered this interest and attention. In the first chapter of the Year Book the authors review the hearings, reports, findings, and recommendations of the Congressional Aircraft Committee, the Hoover Committee, and the President's Aircraft Board. Later chapters are devoted to the marked progress made in the commercial field, covering the extension of airways, municipal air ports, air mail routes, and passenger and freight lines. A summary of the aircraft work in agriculture is included. During 1925 80,000 acres of cotton and 200,000 peach trees were treated by flying machines, and, according to the authors, the farmers and fruit growers are enthusiastic over the results. Addi-

tional chapters cover aerial photography, aircraft in exploration, aeronautical education, American airships, technical development, and other allied subjects.

The volume is more than an annual report. It is written in an interesting style and is profusely illustrated with photographs of the most modern commercial and military planes. A few photographs show some of the municipal hangars. For the reviewer it was a pleasant surprise.—C. S. H.

Rhode Island Privateers in King George's War, 1739-1748. By Howard M. Chapin. Rhode Island Historical Society, Providence. 1926. 5 $\frac{3}{4}$ "x 9". 225 pp. Ill.

With the passing of time there is apparent in America an ever-increasing interest in the events of the earlier years of our history, and it is therefore important that all source material be preserved, collated, and made available to the public. In his present work the author has taken up one of the most romantic phases of a romantic period in our history—privateering near the middle of the eighteenth century. His sources are mainly the manuscript Admiralty Court records of Providence, Boston, New York, and Bermuda; contemporaneous newspapers; and manuscripts in the Rhode Island State Archives, Massachusetts Archives, Rhode Island Historical Society, Massachusetts Historical Society, and Providence Town Records.

After an introductory chapter on privateers in King George's War, the author recounts the voyages of many famous privateering vessels, as the *Three Sisters, Revenge, Charming Betty, Tarter, Prince Charles*, and others. Writing as a historian, without special thought of his readers his meticulous attention to detail imparts a somewhat statistical cast to the book for the general reader. Nevertheless, the exploits of the privateers make interesting reading, the work has been thoroughly and painstakingly done, and the book, besides being a valuable historical record, is well worth while.

Matter, Man, and Mind. By W. F. F. Shearcroft. MacMillan Company, New York. 1926. 5 $\frac{1}{2}$ "x 8 $\frac{1}{2}$ ". 191 pp.

Herein the author presents a modern interpretation of the known universe, with man as the center and the mind of man as the crowning product of creation. His field is broad and he talks of many things, but not entirely of cabbages and kings. Mr. Shearcroft's philosophy is based on science—not on metaphysics. He reviews rapidly the progress made in various scientific fields, touching such subjects as electricity, biological chemistry, cosmology, relativity, and evolution, pointing out truths unearthed and emphasizing methods employed. In this review, however, he is not attempting to present an outline of science. Rather his main effort is directed toward the study of man—his potentialities and possibilities—in his relation to the universe in the light of scientific learning. The author's ideas are couched in simple language, and while the subject matter is not always easy, it is well adapted to the capabilities of the college graduate, and within the comprehension of the non-graduate. The author advertises the fact that the book is not written to "fill a long felt want." Be that as it may, the average reader will find the subject matter stimulating.—C. S. H.

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Those who would wreck our military forces love to say that some 90 per cent of the taxpayers money is expended on war, while less than 10 per cent is devoted to education. These people are evidently talking of Congressional appropriations only. The taxpayers carry four separate and distinct burdens. That is they carry national, state, county, and city budgets. It is the duty of Congress *alone* "to provide for the common defense," but it is *not* its duty to provide for education. How unfair, then, to compare the amounts Congress appropriates for war and for education.—*Captain L. M. Overstreet, U. S. N.*

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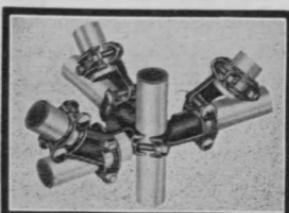
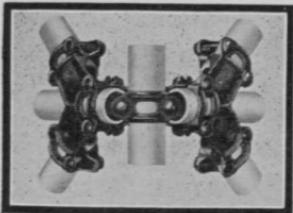
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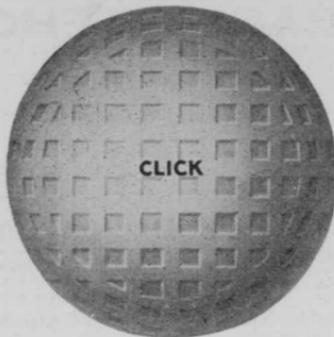
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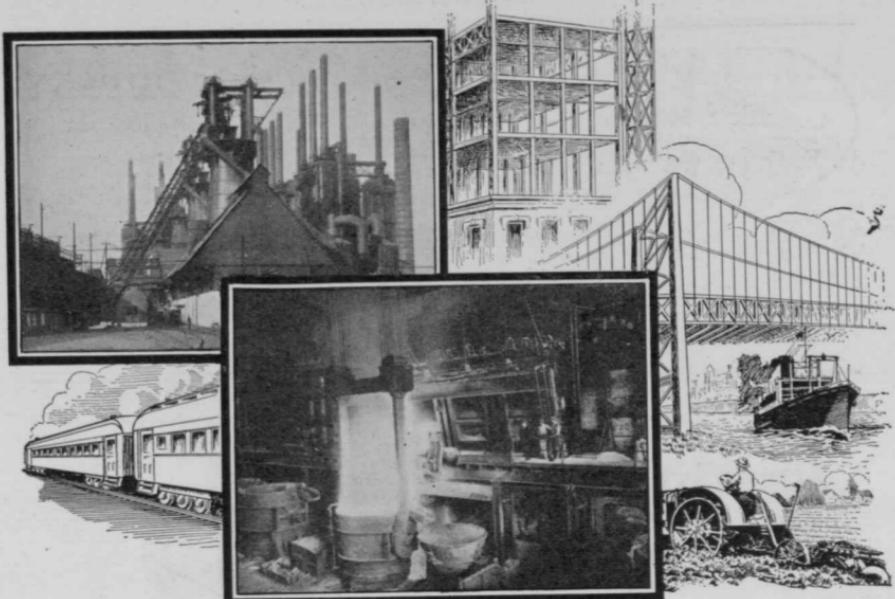
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